MACROECONOMICS (LUMEN)



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Book: Macroeconomics (Lumen)

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Glossary

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Licensing

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1.1: Why It Matters- Economic Thinking



Why study economics?

Many students find the prospect of taking an economics course daunting (or maybe just dull). At the heart of this worry is perhaps just a misperception of what economics is about. It's not rocket science, it's not a collection of boring facts, and it's not the study of money or the stock market. Economics is really just a set of interesting questions organized around a simple fact: there aren't enough resources (money, land, time, etc.) to go around or satisfy all our needs and desires. Economists call this condition scarcity. It affects individuals, nations, and the entire human species—no one ever has enough of the things they want. On some level, everyone has to grapple with scarcity, and economists are interested in understanding how people do that.

If you understand how people behave in the face of scarcity—and learn to think like an economist—economics can be an amazingly powerful tool. You can predict the behavior of individual economic agents, such as consumers or businesses—what economists call the micro level. You can predict the behavior of an economy (or economies) as a whole—what economists call the macro level. You can have a better understanding of the choices—and consequences—in your own life.

Consider the following example:

Imagine that you're about to catch a flight to Italy. You've saved and saved to pay for this trip, and you're thrilled to finally be going. You're on top of the world, until . . .

You get to the airport and have to go through security. The line is terrible. What choice do you have? You can't board the plane without passing security. As you wait, you notice a different aisle for "special" passengers who fly more often. They aren't waiting at all. In fact, if more than three of them collect in the line and have to wait for more than a minute, they act very annoyed—shifting their weight, rolling their eyes, checking their phones, and so on. Oh, brother! You've been waiting so much longer! How is that fair?

Finally you make it through security and reach your gate. Sadly, you are in zone 5, which boards last. You have to struggle down the aisle—past rows of seats with more leg room—to a center seat. Worse, those who boarded before you have filled all the overhead bins. A flight attendant seems irritated that you have a large carry-on bag that won't fit under your seat. He takes your bag off the plane and tells you to pick it up at baggage claim after the flight.

You tuck in your elbows and squeeze into your seat thinking, "This isn't fair."

Not sure what all this has to do with scarcity? You need to study economics!

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1.2: Introduction to Economics

What you'll learn to do: explain what economics is and explain why it is important



Most people think of money when they think of economics. While that is certainly one aspect of it, economics is about a lot more than money. Really, it is a study about decision-making and choices, and how scarcity and competition lead people to behave.

Watch It

Watch this video for a brief overview of economics. You'll often encounter videos like this, enclosed inside of "Watch It" boxes, in this course. These are *highly recommended* and serve as wonderful tools to review and enhance your understanding of the concepts presented. Even if you feel like you understand the material in the reading, it is worthwhile to watch the videos.

An interactive or media element has been excluded from this version of the text. You can view it online here: http://pb.libretexts.org/mlum/?p=50

In order to understand economics, it's important to master a set of key definitions and understand how they interconnect. These concepts will be used many times throughout the course. At the most basic level:

- **Scarcity** means that there are never enough resources to satisfy all human wants
- **Economics** is the study of the trade-offs and choices that we make, given the fact of scarcity
- **Opportunity cost** is what we give up when we choose one thing over another

In this section, we will spend more time with these definitions, and understand how they're used in the context of this discipline.

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1.3: Understanding Economics and Scarcity

Learning Objectives

- Describe scarcity and explain its economic impact
- Describe factors of production



Figure 1. Food, like the wheat shown here, is a scarce good because it exists in limited supply.

Scarcity

The resources that we value—time, money, labor, tools, land, and raw materials—exist in limited supply. There are simply never enough resources to meet all our needs and desires. This condition is known as scarcity.

At any moment in time, there is a finite amount of resources available. Even when the number of resources is very large, it's limited. For example, according to the U.S. Bureau of Labor Statistics, in 2016, the labor force in the United States contained more than 158 million workers—that's a lot, but it's not infinite. Similarly, the total area of the United States is 3,794,101 square miles—an impressive amount of acreage, but not endless. Because these resources are limited, so are the numbers of goods and services we can produce with them. Combine this with the fact that human wants seem to be virtually infinite, and you can see why scarcity is a problem.

Try It

Throughout the course, you will find these "Try It" boxes with questions to help you check your understanding and apply the concepts from the reading. Choose an answer, then select "check answer" to get feedback about how you did.

https://assessments.lumenlearning.co...sessments/7064

Economics

When faced with limited resources, we have to make choices. Again, economics is the study of how humans make choices under conditions of scarcity. These decisions can be made by individuals, families, businesses, or societies.

Let's consider a few decisions that we make based on limited resources. Take the following:

1. What classes are you taking this term?

Are you the lucky student who is taking every class you wanted with your first-choice professor during the perfect time and at the ideal location? The odds are that you have probably had to make trade-offs on account of scarcity. There is a limited number of time slots each day for classes and only so many faculty available to teach them. Every faculty member can't be assigned to every time slot. Only one class can be assigned to each classroom at a given time. This means that each student has to make trade-offs between the time slot, the instructor, and the class location.

2. Where do you live?

Think for a moment, if you had all the money in the world, where would you live? It's probably not where you're living today. You have probably made a housing decision based on scarcity. What location did you pick? Given limited time, you may have chosen to live close to work or school. Given the demand for housing, some locations are more expensive than others, though, and you may have chosen to spend more money for a convenient location or to spend less money for a place that leaves you spending more time

on transportation. There is a limited amount of housing in any location, so you are forced to choose from what's available at any time. Housing decisions always have to take into account what someone can afford. Individuals making decisions about where to live must deal with limitations of financial resources, available housing options, time, and often other restrictions created by builders, landlords, city planners, and government regulations.

Watch it: Scarcity and Choice

Throughout this course you'll encounter a series of short videos that explain complex economic concepts in very simple terms. Take the time to watch them! They'll help you master the basics and understand the readings (which tend to cover the same information in more depth).

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As you watch the video, consider the following key points:

1. Economics is the study of how humans make choices under conditions of scarcity.
2. Scarcity exists when human wants for goods and services exceed the available supply.
3. People make decisions in their own self-interest, weighing benefits and costs.

The Problem of Scarcity

Every society, at every level, must make choices about how to use its resources. Families must decide whether to spend their money on a new car or a fancy vacation. Towns must choose whether to put more of the budget into police and fire protection or into the school system. Nations must decide whether to devote more funds to national defense or to protecting the environment. In most cases, there just isn't enough money in the budget to do everything.

Economics helps us understand the decisions that individuals, families, businesses, or societies make, given the fact that there are never enough resources to address all needs and desires.

Try It

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Economic Goods and Free Goods

Most goods (and services) are **economic goods**, i.e. they are scarce. Scarce goods are those for which the demand would be greater than the supply if their price were zero. Because of this shortage, economic goods have a positive price in the market. That is, consumers have to pay to get them.

What is an example of a good which is not scarce? Water in the ocean? Sand in the desert? Any good whose supply is greater than the demand if their price were zero is called a **free good**, since consumers can obtain all they want at no charge. We used to consider air a free good, but increasingly clean air is scarce.

Try It

https://assessments.lumenlearning.co...sessments/7067

Productive Resources

Having established that resources are limited, let's take a closer look at what we mean when we talk about resources. There are four **productive resources** (resources have to be able to produce something), also called **factors of production**:

- **Land:** any natural resource, including actual land, but also trees, plants, livestock, wind, sun, water, etc.
- **Economic capital:** anything that's manufactured in order to be used in the production of goods and services. Note the distinction between financial capital (which is not productive) and economic capital (which is). While money isn't directly productive, the tools and machinery that it buys can be.
- **Labor:** any human service—physical or intellectual. Also referred to as *human capital*.
- **Entrepreneurship**: the ability of someone (an entrepreneur) to recognize a profit opportunity, organize the other factors of production, and accept risk.

Try It

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https://assessments.lumenlearning.co...essments/17220

Watch It

Productive resources and factors of production are explained again in more detail in the following video:

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Glossary

[glossary-page][glossary-term]economic goods: [/glossary-term]
[glossary-definition]goods or services a consumer must pay to obtain; also called scarce goods [/glossary-definition][glossary-term]free goods: [/glossary-term][glossary-definition]goods or services that a consumer can obtain for free because they are abundant relative to the demand[/glossary-definition][glossary-term]productive resources:[/glossary-term][glossary-definition] the inputs used in the production of goods and services to make a profit: land, economic capital, labor, and entrepreneurship; also called “factors of production”[/glossary-definition]
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1.4: The Concept of Opportunity Cost

Learning Objectives

- Describe opportunity cost and its importance in decision-making



Figure 1. What is the opportunity cost of choosing the blue door?

The Idea of Opportunity Cost

Since resources are limited, every time you make a choice about how to use them, you are also choosing to forego other options. Economists use the term **opportunity cost** to indicate what must be given up to obtain something that's desired. A fundamental principle of economics is that every choice has an opportunity cost. If you sleep through your economics class (not recommended, by the way), the opportunity cost is the learning you miss. If you spend your income on video games, you cannot spend it on movies. If you choose to marry one person, you give up the opportunity to marry anyone else. In short, opportunity cost is all around us.

The idea behind opportunity cost is that the cost of one item is the lost opportunity to do or consume something else; in short, opportunity cost is the value of the next best alternative.

Since people must choose, they inevitably face trade-offs in which they have to give up things they desire to get other things they desire more.

Opportunity Cost and Individual Decisions

In some cases, recognizing the opportunity cost can alter personal behavior. Imagine, for example, that you spend $8 on lunch every day at work. You may know perfectly well that bringing a lunch from home would cost only $3 a day, so the opportunity cost of buying lunch at the restaurant is $5 each day (that is, the $8 that buying lunch costs minus the $3 your lunch from home would cost). Five dollars each day does not seem to be that much. However, if you project what that adds up to in a year—250 workdays a year × $5 per day equals $1,250—it's the cost, perhaps, of a decent vacation. If the opportunity cost were described as "a nice vacation" instead of "$5 a day," you might make different choices.

Try It

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Opportunity Cost and Societal Decisions

Opportunity cost also comes into play with societal decisions. Universal health care would be nice, but the opportunity cost of such a decision would be less housing, environmental protection, or national defense. These trade-offs also arise with government policies. For example, after the terrorist plane hijackings on September 11, 2001, many proposals, such as the following, were made to improve air travel safety:

- The federal government could provide armed "sky marshals" who would travel inconspicuously with the rest of the passengers. The cost of having a sky marshal on every flight would be roughly $3 billion per year.

- Retrofitting all U.S. planes with reinforced cockpit doors to make it harder for terrorists to take over the plane would have a price tag of $450 million.
- Buying more sophisticated security equipment for airports, like three-dimensional baggage scanners and cameras linked to face-recognition software, would cost another $2 billion.



Figure 2. Time and Money. Lost time can be a significant component of opportunity cost.

However, the single biggest cost of greater airline security doesn't involve money. It's the opportunity cost of additional waiting time at the airport. According to the United States Department of Transportation, more than 800 million passengers took plane trips in the United States in 2012. Since the 9/11 hijackings, security screening has become more intensive, and consequently, the procedure takes longer than in the past. Say that, on average, each air passenger spends an extra 30 minutes in the airport per trip. Economists commonly place a value on time to convert an opportunity cost in time into a monetary figure. Because many air travelers are relatively highly paid businesspeople, conservative estimates set the average "price of time" for air travelers at $20 per hour. Accordingly, the opportunity cost of delays in airports could be as much as 800 million (passengers) × 0.5 hours × $20/hour —or, $8 billion per year. Clearly, the opportunity costs of waiting time can be just as substantial as costs involving direct spending.

Try It

https://assessments.lumenlearning.co...sessments/7069

Watch It: Opportunity Cost

Watch this video to see some more examples and a deeper explanation of opportunity cost.

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Glossary

[glossary-page][glossary-term]opportunity cost: [/glossary-term]
[glossary-definition]the value of the next best alternative[/glossary-definition]
[/glossary-page]

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1.5: Labor, Markets, and Trade

Learning Objectives

- Explain how specialization and the division of labor lead to trade and markets

The Division and Specialization of Labor



Figure 1.Factory. An assembly line.

We have learned that there aren't enough resources to fulfill all of our wants and this reality forces us to make choices that have opportunity costs. How do we get the most we can from the resources we have? Over time, markets and trade have come into existence and have become highly efficient mechanisms for optimizing our use of resources and bringing us the most and best combination of goods and services.

Think back to pioneer days, when the average person knew how to do so much more on his or her own than someone today—everything from shoeing a horse to growing, hunting, and preserving food to building a house and repairing equipment. Most of us don't know how to do all—or any—of those things. It's not because we're not capable of learning them. It's because we don't have to. The reason for this is something called the "division and **specialization** of labor," a production innovation first put forth by Adam Smith.

The formal study of economics began when Adam Smith (1723–1790) published his famous book, *The Wealth of Nations*, in 1776. Many authors had written about economics in the centuries before Smith, but he was the first to address the subject in a comprehensive way.

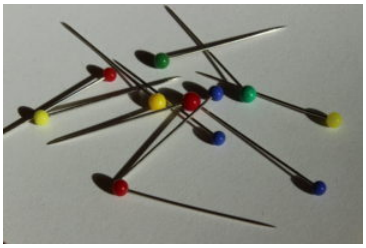


Figure 2. Pins. Who knew that making a pin was so complex?

In the first chapter of the book, Smith introduces the idea of the **division of labor**, which means that the way a good or service is produced is divided into a number of tasks that are performed by different workers, instead of all the tasks being performed by the same person. To illustrate the division of labor, Smith counted how many tasks were involved in making a pin: drawing out a piece of wire, cutting it to the right length, straightening it, putting a head on one end and a point on the other, packaging pins for sale, and so on. Smith counted *eighteen* distinct tasks that were typically performed by different people—all for a pin!

Modern companies divide tasks, too. Even a relatively simple business like a restaurant divides up the task of serving meals into a range of jobs: top chef, sous chefs, less-skilled kitchen help, host/hostess, waiters/waitresses, janitors, a business manager to handle accounts and paychecks, etc. A complex business like a large manufacturing factory or a hospital can have hundreds of job classifications.

Try It

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Why the Division of Labor Increases Production

When the tasks involved with producing a good or service are divided and subdivided, workers and businesses can produce a greater quantity of those goods or services. In his study of pin factories, Smith observed that one worker alone might make twenty pins in a day, but that a small business of ten workers (some of whom would need to do two or three of the eighteen tasks involved in pin making), could make forty-eight thousand pins in a day. How can a group of workers, each specializing in certain tasks, produce so much more than the same number of workers who try to produce the entire good or service by themselves? Smith offered three reasons.First, specialization in a particular small job allows workers to focus on the parts of the production process in which they have an advantage. People have different skills, talents, and interests, so they will be better at some jobs than at others. The particular advantages may be based on educational choices, which are shaped, in turn, by interests and talents. Only those with medical training qualify to become doctors, for instance. For some goods, specialization will be affected by geography—it's easier to be a wheat farmer in North Dakota than in Florida, but easier to run a tourist hotel in Florida than in North Dakota. If you live in or near a big city, it's easier to attract enough customers to operate a successful dry-cleaning business or movie theater than if you live in a sparsely populated rural area. Whatever the reason, if people specialize in the production of what they do best, they will be more productive than if they produce a combination of things, some of which they are good at and some of which they are not.

Second, workers who specialize in certain tasks often learn to produce more quickly and with higher quality. This pattern holds true for many workers, including assembly-line laborers who build cars, stylists who cut hair, and doctors who perform heart surgery. In fact, specialized workers often know their jobs well enough to suggest innovative ways to do their work faster and better. A similar pattern often operates within businesses. In many cases, a business that focuses on one or a few products is more successful than firms that try to make a wide range of products.

Third, specialization allows businesses to take advantage of **economies of scale**, which means that, for many goods, as the level of production increases, the average cost of producing each individual unit declines. For example, if a factory produces only one hundred cars per year, each car will be quite expensive to make on average. However, if a factory produces fifty thousand cars each year, then it can set up an assembly line with huge machines and workers performing specialized tasks, and the average cost of production per car will drop. Economies of scale implies that production is becoming more efficient as the scale of production rises.

The ultimate result of workers who can focus on their preferences and talents, learn to do their specialized jobs better, and work in larger organizations is that society as a whole can produce and consume far more than if each person tried to produce all of their own goods and services. The division and **specialization** of labor has been a force against the problem of scarcity.

Try It

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Trade and Markets

Specialization only makes sense, though, if workers (and other economic agents such as businesses and nations) can use their income to purchase the other goods and services they need. In short, specialization requires trade. You do not have to know anything about electronics or sound systems to play music—you just buy an iPod or MP3 player, download the music, and listen. You don't have to know anything about textiles or the construction of sewing machines if you need a jacket—you just buy the jacket and wear it. Instead of trying to acquire all the knowledge and skills involved in producing all of the goods and services that you wish to consume, the market allows you to learn a specialized set of skills and then use the pay you receive to buy the goods and services you need or want. This is how our modern society has evolved into a strong economy.

Try It

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Glossary

[glossary-page][glossary-term]division of labor: [/glossary-term]
[glossary-definition]the way in which the work required to produce a good or service is divided into tasks performed by different workers[/glossary-definition][glossary-term]economies of scale: [/glossary-term][glossary-definition]when the average cost of producing each individual unit declines as total output increases[/glossary-definition][glossary-term]specialization: [/glossary-term][glossary-definition]when workers or firms focus on particular tasks for which they are well suited within the overall production process[/glossary-definition]
[/glossary-page]

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1.6: Microeconomics and Macroeconomics

Learning Objectives

- Distinguish between macroeconomics and microeconomics

Micro vs. Macro

It should be clear by now that economics covers a lot of ground. That ground can be divided into two parts: **microeconomics** focuses on the actions of individual agents within the economy, like households, workers, and businesses; **macroeconomics** looks at the economy as a whole. It focuses on broad issues such as growth, unemployment, inflation, and trade balance. Microeconomics and macroeconomics are not separate subjects but are, rather, complementary perspectives on the overall subject of the economy.

To understand why both microeconomic and macroeconomic perspectives are useful, consider the problem of studying a biological ecosystem like a lake. One person who sets out to study the lake might focus on specific topics: certain kinds of algae or plant life; the characteristics of particular fish or snails; or the trees surrounding the lake. Another person might take an overall view and instead consider the entire ecosystem of the lake from top to bottom: what eats what, how the system remains in balance, and what environmental stresses affect this balance. Both approaches are useful, and both researchers study the same lake, but the viewpoints are different. In a similar way, both microeconomics and macroeconomics study the same economy, but each has a different starting point, perspective, and focus.



Figure 1. Macroeconomists might look at the larger ecosystem in this image, while a microeconomist would focus on specific features.

Whether you are looking at lakes or economics, the micro and the macro insights should illuminate each other. In studying a lake, the “micro” insights about particular plants and animals help us to understand the overall food chain, while the “macro” insights about the overall food chain help to explain the environment in which individual plants and animals live.

In economics, the micro decisions of individual businesses are influenced by the health of the macroeconomy—for example, firms will be more likely to hire workers if the overall economy is growing. In turn, the performance of the macroeconomy ultimately depends on the microeconomic decisions made by individual households and businesses.

Microeconomics

What determines how households and individuals spend their budgets? What combination of goods and services will best fit their needs and wants, given the budget they have to spend? How do people decide whether to work, and if so, whether to work full time or part time? How do people decide how much to save for the future, or whether they should borrow to spend beyond their current means?

What determines the products, and how many of each, a firm will produce and sell? What determines what prices a firm will charge? What determines how a firm will produce its products? What determines how many workers it will hire? How will a firm finance its business? When will a firm decide to expand, downsize, or even close? In the microeconomic part of this text, we will learn about the theory of consumer behavior and the theory of the firm.

Macroeconomics

What determines the level of economic activity in a society or nation?—that is, how many goods and services does it actually produce? What determines how many jobs are available in an economy? What determines a nation’s standard of living? What

causes the economy to speed up or slow down? What causes firms to hire more workers or lay them off? Finally, what causes the economy to grow over the long term?

An economy's macroeconomic health can be assessed by a number of standards or goals. The most important macroeconomic goals are the following:

- Growth in the standard of living
- Low unemployment
- Low inflation

Macroeconomic policy pursues these goals through monetary policy and fiscal policy:

- **Monetary policy**, which involves policies that affect bank lending, interest rates, and financial capital markets, is conducted by a nation's central bank. For the United States, this is the Federal Reserve.
- **Fiscal policy**, which involves government spending and taxes, is determined by a nation's legislative body. For the United States, this is the Congress and the executive branch, which establishes the federal budget.

To keep the differences between these policies straight, remember that the term *monetary* relates to money, and the term *fiscal* relates to government revenue or taxes.

These are the main tools the government has to work with. Americans tend to expect that government can fix whatever economic problems we encounter, but to what extent is that expectation realistic? These are just some of the issues that will be explored later in this course.

Try It

https://assessments.lumenlearning.co...sessments/7073

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WAtch It

The differences between microeconomics and macroeconomics as well as their respective and focal points are explained again in the following video:

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Glossary

[glossary-page][glossary-term]fiscal policy: [/glossary-term]
[glossary-definition]economic policies that involve government spending and taxes[/glossary-definition][glossary-term]macroeconomics: [/glossary-term][glossary-definition]the branch of economics that focuses on broad issues such as growth, unemployment, inflation, and trade balance[/glossary-definition][glossary-term]microeconomics: [/glossary-term][glossary-definition]the branch of economics that focuses on actions of particular agents within the economy, like households, workers, and businesses[/glossary-definition]
[glossary-term]monetary policy: [/glossary-term][glossary-definition]policy that involves altering the level of interest rates, the availability of credit in the economy, and the extent of borrowing[/glossary-definition]
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1.7: Introduction to Math in Economics

What you'll learn to do: use mathematics in common economic applications



Earlier we defined economics as the study of how people choose to use scarce resources to best satisfy their unlimited wants. Economists try to analyze these choices both at the individual level (what wage does Alissa require in order to take that job?) and broader societal level (what is the impact of minimum wage on the unemployment rate?). The principal tools economists use to do this are models.

Economists use math as a tool for manipulating and exploring economic models. Sometimes it makes sense to express economic ideas in words; other times, math does a better job. Economics is not math, but rather math is a tool for presenting and manipulating/exploring/using economic models. Many economic models use math to explain cause and effect. Don't worry, though, we're going to cover all the math you need to solve the problems in this course.

This section provides a quick review of some basic math (so you can avoid common errors) and then introduces the mathematical concepts you'll need throughout the course. **Don't forget: return to this section later on if you encounter math that you can't follow.**

Some students, when they find out that economics involves math, fear that the math will trip them up and prevent their success in the course—"I'm not a math person!" they think. If you share these thoughts, it may surprise you to know there's scientific research showing that when you practice new ways of thinking, your brain physically changes and adapts. Essentially, there's no such thing as "a math person" (or an "economics person"). You don't need a special talent or aptitude. It's mainly a matter of practice, hard work, and training your brain. The more you challenge your mind to learn, the more your brain cells connect to one another and the stronger those connections become.

So, how do you actually develop your brain and succeed in this kind of course? We asked some former students to tell us their advice for success. They said it was most important to

- Do the practice problems in the course.
- Ask questions.
- Study your mistakes.
- Explain the ideas to yourself in different ways until they are clear.

You will need to learn new things to pass this class, and you should expect it to feel hard as you wrestle with unfamiliar ideas and new ways of thinking. Don't give up, though! The feeling of struggling is a normal part of how the brain gets stronger when it learns things.

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1.8: Economic Models

Learning Objectives

- Explain the characteristics and purpose of economic models

An **economic model** is a simplified version of reality that allows us to observe, understand, and make predictions about economic behavior. The purpose of a model is to take a complex, real-world situation and pare it down to the essentials. If designed well, a model can give the analyst a better understanding of the situation and any related problems.

A good model is simple enough to be understood while complex enough to capture key information. Sometimes economists use the term *theory* instead of *model*. Strictly speaking, a theory is a more abstract representation, while a model is a more applied or empirical representation. Often, models are used to test theories. In this course, however, we will use the terms interchangeably.

WAtch It

Watch this video to get a better grasp on economic models and why they are useful to economists in making predictions about behavior.

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Economic Models and Math

Economists use models as the primary tool for explaining or making predictions about economic issues and problems. For example, an economist might try to explain what caused the Great Recession in 2008, or she might try to predict how a personal income tax cut would affect automobile purchases.

Economic models can be represented using words or using mathematics. All of the important concepts in this course can be explained without math. That said, math is a tool that can be used to explore economic concepts in very helpful ways. You know the saying “A picture is worth a thousand words”? The same applies to graphs: they’re a very effective means of conveying information visually—without a thousand words. In addition to being a “picture,” a graph is also a math-based model.

The use of algebra is a specific way that economics express and explore economic models. Where graphs require you to “eyeball” a model, algebra can give you more precise answers to questions. For example, if a business puts their product on sale for 10% off the regular price, how much more will consumers buy? Similarly, using the algebraic formula for a line allows economists to find precise points on a graphs that help in interpreting how much of a good should be sold, or at what price.

Why would an economist use math when there are other ways of representing models, such as with text or narrative? Why would you use your fist to bang a nail, if you had a hammer? Math has certain advantages over text. It disciplines our thinking by making us specify exactly what we mean. You can get away with fuzzy thinking and vague approximations in your own mind, but not when you’re reducing a model to algebraic equations. At the same time, math has certain disadvantages. Mathematical models lack the nuances that can be found in narrative models. The point is that math is one tool, but it’s not the only tool or even always the best tool economists can use to work with economic models.

Try It

https://assessments.lumenlearning.co...sessments/7076

Examples of Models



Figure 1. A architectural model.

An architect who is designing a major office building will probably build a physical model that sits on a tabletop to show how the entire city block will look after the new building is constructed. Companies often build models of their new products that are rougher and less finished than the final product but can still demonstrate how the new product will work and look. Such models help people visualize a product (or a building) in a more complete, concrete way than they could without them.

Similarly, economic models offer a way to get a complete view or picture of an economic situation and understand how economic factors fit together.

A good model to start with in economics is the **circular flow diagram** (Figure 2, below). Such a diagram indicates that the economy consists of two groups, households and firms, which interact in two markets: the **goods-and-services market** (also called the *product market)*, in which firms sell and households buy, and the **labor market**, in which households sell labor to business firms or other employees.

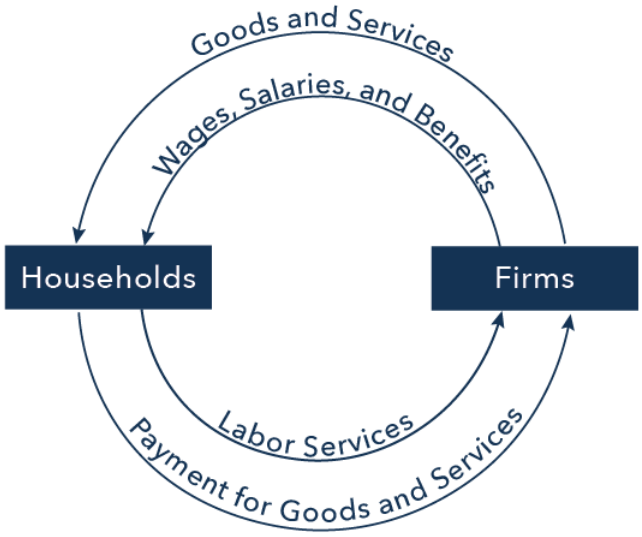


Figure 2. The Circular Flow Diagram.

Of course, in the real world, there are many different markets for goods and services and markets for many different types of labor. The circular flow diagram simplifies these distinctions in order to make the picture easier to grasp. In the diagram, firms produce goods and services, which they sell to households in return for payments. The outer ring represents the two sides of the product market (which provides goods and services), in which households demand and firms supply. In addition, households (as workers) sell their labor to firms in return for wages, salaries, and benefits. This is shown in the inner circle, which represents the two sides of the labor market, in which households supply and firms demand. This version of the circular flow model is stripped down to the essentials, but it has enough features to explain how the product and labor markets work in the economy.

We could easily add details to this basic model if we wanted to introduce more real-world elements, like financial markets, governments, or interactions with the rest of the world (imports and exports). Economists reach for theories in much the same way as a carpenter might grab a tool. When economists identify an economic issue or problem, they sift through the available theories to see if they can find one that fits. Then they use the theory to give them insights about the issue or problem. In economics, theories are expressed in models as diagrams, graphs, or even as mathematical equations. Counter to what you might expect, economists don't figure out the solution to a problem and then draw the graph. Instead, they use the graph to help them discover the answer. In this way, these graphs serve as models to make inferences about behavior.

At the introductory level, you can sometimes figure out the right answer without using a model, but if you keep studying economics, before too long you'll encounter issues and problems whose solution will require graphs. Both micro and macroeconomics are explained in terms of theories and models. The most well-known theories are probably those of supply and demand, but you will learn about several others.

Try It

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Glossary

[glossary-page][glossary-term]circular flow diagram: [/glossary-term]
[glossary-definition]a diagram indicating that the economy consists of households and firms interacting in a goods-and-services market and a labor market[/glossary-definition][glossary-term]goods and services market: [/glossary-term][glossary-definition]a market in which firms are sellers of what they produce and households are buyers[/glossary-definition][glossary-term]economic model: [/glossary-term]
[glossary-definition]is a simplified version of reality that allows us to observe, understand, and make predictions about economic behavior[/glossary-definition][glossary-term]labor market: [/glossary-term][glossary-definition]the market in which households sell their labor as workers to businesses or other employers[/glossary-definition]
[/glossary-page]

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1.9: Purpose of Functions

Learning Objectives

- Explain how equations and functions are used to describe relationships (such as cause and effect)

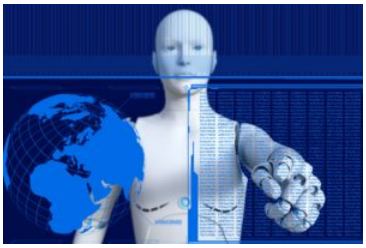


Figure 1. Math and Predictions. We can make predictions in economics by applying mathematical concepts.

Often, economic models are expressed in terms of mathematical functions. What's a function? Basically, a **function** describes a relationship involving one or more variables. Sometimes the relationship is a definition. For example (using words), Joan of Arc is a professor. This could be expressed as Joan of Arc = professor. Or, food = cherries, cheese, and chocolate means that cherries, cheese, and chocolate are food.

In economics, functions frequently describe cause and effect. The variable on the left-hand side is what is being explained ("the effect"). On the right-hand side is what's doing the explaining ("the causes"). Functions are also useful for making predictions. For example, think about your grade in this course. We might be able to predict how well you will do in this course by considering how well you've done in other courses, by how much you attend class or participate in the online activities, and by how many hours you study.

Not all of those things will have equal impact on your grade. Let's assume that your study time is most important and will have twice as much impact as the other factors. We are trying to describe 100 percent of the impact, so study time will explain 50 percent, attendance and participation will explain 25 percent, and your prior class grades will describe 25 percent. Together, this adds up to 100 percent.

Now, let's turn that into a function. Your grade in the course can be represented as the following:

$$\text{Grade} = (0.50 \times \text{hours spent studying}) + (0.25 \times \text{class attendance}) + (0.25 \times \text{prior GPA})$$

This equation states that your grade depends on three things: the number of hours you spend studying, your class attendance, and your prior course grades represented as your grade-point average (GPA). It also says that study time is twice as important (0.50) as either class attendance (0.25) or prior GPA score (0.25). If this relationship is true, how could you raise your grade in this course? By not skipping class and studying more. Note that you cannot do anything about your prior GPA, since that is calculated from courses you've already taken and grades you've already received.

Try It

https://assessments.lumenlearning.co...sessments/7078

Economic models tend to express relationships using economic variables, such as:

$$\text{Budget} = \text{money spent on econ books} + \text{money spent on music}$$

(assuming that the only things you buy are economics books and music). Often, there is some assumption that has to be explained in order to identify where the model has been simplified.

As you can see, in economic models the math isn't difficult. It's used to help describe and explain the relationships between variables.

Glossary

[glossary-page][glossary-term]function: [/glossary-term]
[glossary-definition]a relationship or expression involving one or more variables[/glossary-definition][/glossary-page]

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1.10: Solving Simple Equations

Learning Objectives

- Use proper order of operations while solving simple equations with variables

Let's quickly review some math concepts that will help you avoid simple errors in your work.

Order of Operations

Remember, when you solve an equation it's important to do each operation in the following order:

1. Simplify inside parentheses and brackets.
2. Simplify the exponent.
3. Multiply and divide from left to right.
4. Add and subtract from left to right.

In this course you will not use exponents, but you will need to remember the order of the other steps. So, in solving the following equation, you multiply first, then add:



Try It

These next two questions allow you to get as much practice as you need, as you can click the link at the top of each question ("Try another version of this question") to get a new question. Practice until you feel comfortable doing the questions and then move on.

[ohm_question]92254[/ohm_question]
[ohm_question]92266[/ohm_question]

Try It

These next two problems are a little harder. See if you can do them. Remember to apply the order of operations: simplify inside parentheses first; then multiply and divide left to right; finally add and subtract left to right.

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https://assessments.lumenlearning.co...essments/7082b

Lines

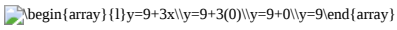
In this course the most common equation you will see is  . This is the equation for a line. We will revisit this equation later in this module when we review graphs. For now, let's practice solving this common equation using different variables.

Understanding Variables

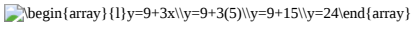
To a mathematician or an economist, a **variable** is the name given to a quantity that can assume a range of values. In other words, the value of a variable can change or vary. In an equation it's represented by a letter or a symbol. Because economic models often consider cause and effect, variables are important. You will often be asked to consider a range of options that result from different variables. Below is a very simple example:



In order to understand the range of options, we might start with 0. What does *y* equal if  ?

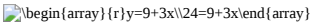


Now, let's look at the same formula with different information. What does y equal if  ?

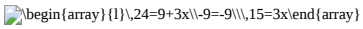


Working with Variables

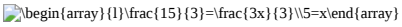
Remember that when you're trying to solve an equation with one or more variables, you need to isolate the variable. Let's walk through a simple example using the same equation from above. What if we want to solve the equation in a case where ?



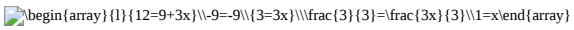
First, subtract the same number from each side of the equation to simplify the equation without changing the fact that it's an equality. In this case, we want to subtract the number that will enable us to isolate *x* (*x* is on one side of the equal sign all by itself). We can do that by subtracting 9 from each side.



Now we can further simplify the equation by dividing both sides by 3.



Let's practice solving for *x* one more time. What does *x* equal if  ?



Try It

These next two questions allow you to get as much practice as you need, as you can click the link at the top of each question ("Try another version of this question") to get a new question. Practice until you feel comfortable doing the questions and then move on.

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[ohm_question]92303[/ohm_question]

Glossary

[glossary-page][glossary-term]variable: [/glossary-term]
[glossary-definition]a quantity that can assume a range of values[/glossary-definition][/glossary-page]

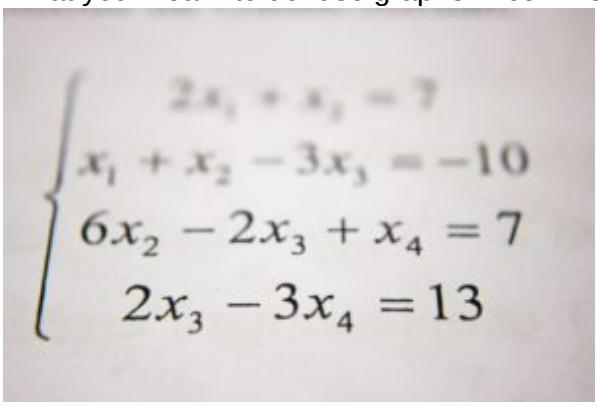
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1.11: Introduction to Graphs in Economics

What you'll learn to do: use graphs in common economic applications



In this course, the most common way you will encounter economic models is in graphical form.

A graph is a visual representation of numerical information. Graphs condense detailed numerical information to make it easier to see patterns (such as "trends") among data. For example, which countries have larger or smaller populations? A careful reader could examine a long list of numbers representing the populations of many countries, but with more than two hundred nations in the world, searching through such a list would take concentration and time. Putting these same numbers on a graph, listing them from highest to lowest, would reveal population patterns much more readily.

Economists use graphs not only as a compact and readable presentation of data, but also for visually representing relationships and connections—in other words, they function as models. As such, they can be used to answer questions. For example: How do increasing interest rates affect home sales? Graphing the results can help illuminate the answers.

This section provides an overview of graphing—just to make sure you're up to speed on the basics. It's important to feel comfortable with the way graphs work before using them to understand new concepts.

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1.12: Creating and Interpreting Graphs

Learning Objectives

- Explain how to construct a simple graph that shows the relationship between two variables

It's important to know the terminology of graphs in order to understand and manipulate them. Let's begin with a visual representation of the terms (shown in Figure 1), and then we can discuss each one in greater detail.

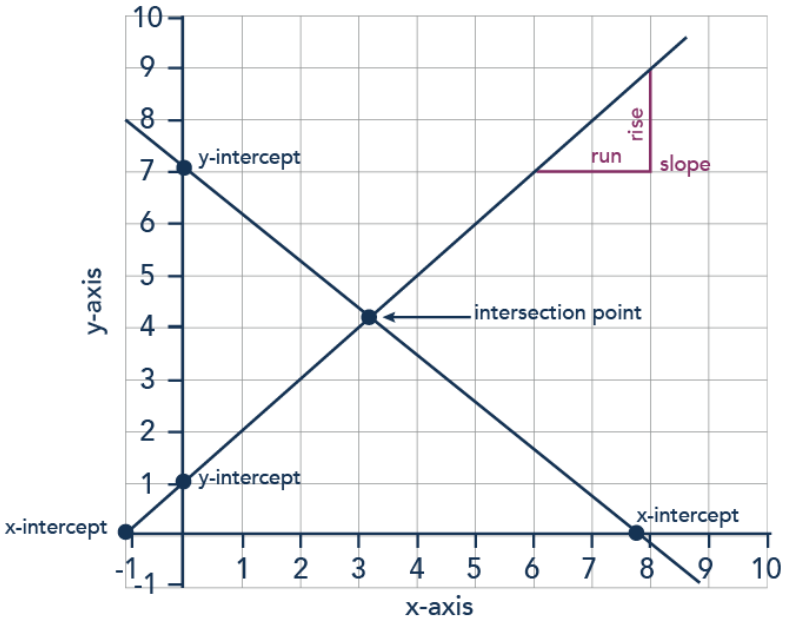


Figure 1. Graph Terminology.

Throughout this course we will refer to the horizontal line at the base of the graph as the **x-axis**. We will refer to the vertical line on the left hand side of the graph as the **y-axis**. This is the standard convention for graphs. In economics, we commonly use graphs with price (p) represented on the y-axis, and quantity (q) represented on the x-axis.

An **intercept** is where a line on a graph crosses ("intercepts") the x-axis or the y-axis. Mathematically, the x-intercept is the value of x when y = 0. Similarly, the y-intercept is the value of y when x = 0. You can see the x-intercepts and y-intercepts on the graph above.

The point where two lines on a graph cross is called an **intersection point**.

The other important term to know is *slope*. The slope tells us how steep a line on a graph is as we move from one point on the line to another point on the line. Technically, **slope** is the change in the vertical axis divided by the change in the horizontal axis. The formula for calculating the slope is often referred to as the "rise over the run"—again, the change in the distance on the y-axis (rise) divided by the change in the x-axis (run).

Now that you know the "parts" of a graph, let's turn to the equation for a line:

$$y = mx + b$$

In any equation for a line, *m* is the slope and *b* is the y-intercept.

Let's use the same equation we used earlier, in the section on solving algebraic equations, y = 9 + 3x, which can also be written as:

$$y = 3x + 9$$

In this equation for a line, the *b* term is 9 and the *m* term is 3. The table below shows the values of *x* and *y* for this equation. To construct the table, just plug in a series of different values for *x*, and then calculate the resulting values for *y*.

Values
for the

Slope
Intercept
Equation

x	y
0	9
1	12
2	15
3	18
4	21
5	24
6	27

Next we can place each of these points on a graph. We can start with 0 on the *x*-axis and plot a point at 9 on the *y*-axis. We can do the same with the other pairs of values and draw a line through all the points, as on the graph in Figure 2, below.

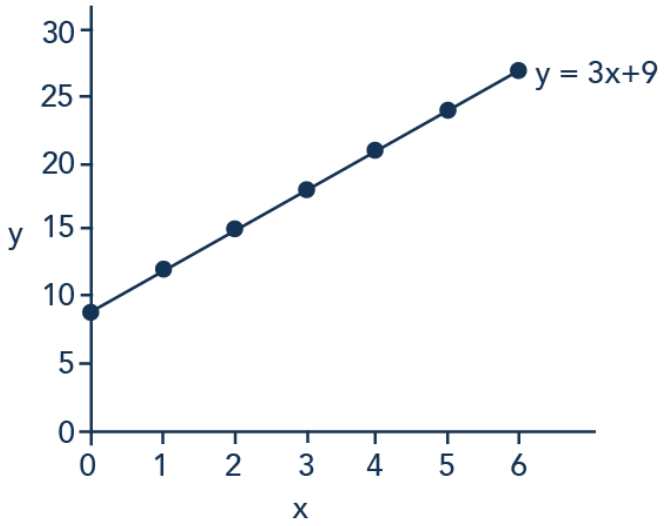


Figure 2. Slope and Algebra of a Straight Line.

This example illustrates how the *b* and *m* terms in an equation for a straight line determine the position of the line on a graph. As noted above, the *b* term is the *y*-intercept. The reason is that if $x = 0$, the *b* term will reveal where the line intercepts, or crosses, the *y*-axis. In this example, the line hits the vertical axis at 9. The *m* term in the equation for the line is the slope. Remember that slope is defined as rise over run; the slope of a line from one point to another is the change in the vertical axis divided by the change in the horizontal axis. In this example, each time the *x* term increases by 1 (the run), the *y* term rises by 3. Thus, the slope of this line is therefore 3/1 = 3. Specifying a *y*-intercept and a slope—that is, specifying *b* and *m* in the equation for a line—will identify a specific line. Although it is rare for real-world data points to arrange themselves as a perfectly straight line, it often turns out that a straight line can offer a reasonable approximation of actual data.

Watch It

Watch this video to take a closer look at graphs and how variables can be represented in graph form. NOTE: Around the two-minute mark, the narrator inadvertently says “indirect,” rather than “inverse.” This is corrected later in the video.

An interactive or media element has been excluded from this version of the text. You can view it online here: http://pb.libretexts.org/mlum/?p=70

Try It

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Glossary

[glossary-page][glossary-term]intercept: [/glossary-term]
[glossary-definition]the point on a graph where a line crosses the vertical axis or horizontal axis [/glossary-definition][glossary-term]slope: [/glossary-term][glossary-definition]the change in the vertical axis divided by the change in the horizontal axis [/glossary-definition][glossary-term]variable: [/glossary-term][glossary-definition]a quantity that can assume a range of values [/glossary-definition][glossary-term]x-axis: [/glossary-term][glossary-definition]the horizontal line on a graph, commonly represents quantity (q) on graphs in economics [/glossary-definition][glossary-term]y-axis: [/glossary-term][glossary-definition]the vertical line on a graph, commonly represents price (p) on graphs in economics [/glossary-definition][/glossary-page]

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1.13: Interpreting Slope

Learning Objectives

- Differentiate between a positive relationship and a negative relationship



Figure 1. This skier speeds down the slope in an Olympic race. What's your guess as to the steepness, or slope, of this ski hill?

What the Slope Means

The concept of slope is very useful in economics, because it measures the relationship between two variables. A **positive slope** means that two variables are positively related—that is, when *x* increases, so does *y*, and when *x* decreases, *y* also decreases. Graphically, a positive slope means that as a line on the line graph moves from left to right, the line rises. We will learn in other sections that "price" and "quantity supplied" have a positive relationship; that is, firms will supply more when the price is higher.

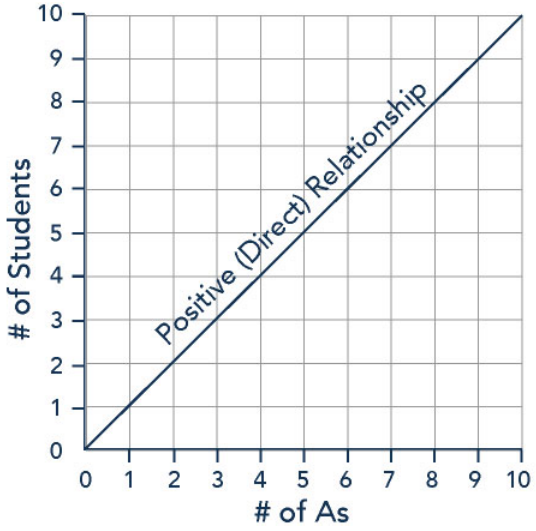


Figure 1. Positive Slope.

A **negative slope** means that two variables are negatively related; that is, when *x* increases, *y* decreases, and when *x* decreases, *y* increases. Graphically, a negative slope means that as the line on the line graph moves from left to right, the line falls. We will learn that "price" and "quantity demanded" have a negative relationship; that is, consumers will purchase less when the price is higher.

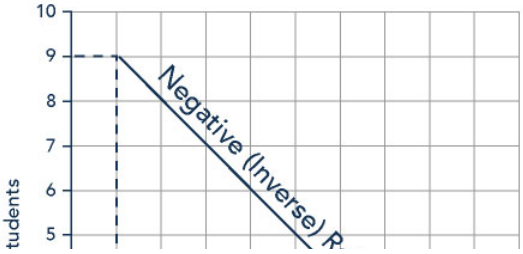


Figure 2. Negative slope.

A **slope of zero** means that *y* is constant no matter the value of *x*. Graphically, the line is flat; the rise over run is zero.

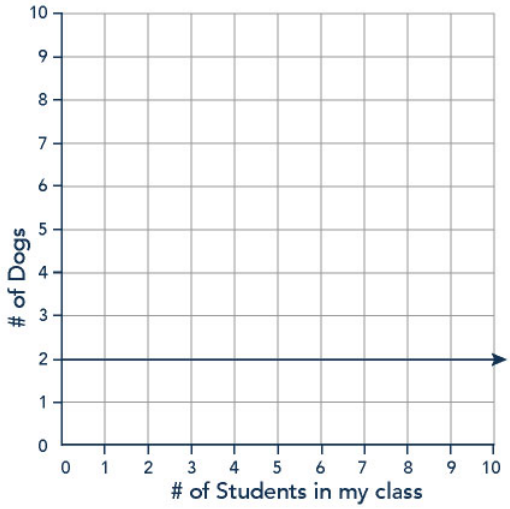


Figure 3. Slope of Zero

The unemployment-rate graph in Figure 4, below, illustrates a common pattern of many line graphs: some segments where the slope is positive, other segments where the slope is negative, and still other segments where the slope is close to zero.

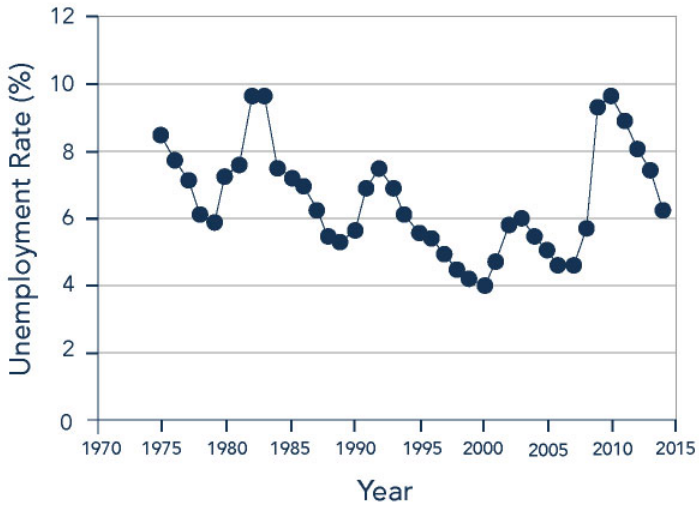


Figure 4. U.S. Unemployment Rate, 1975–2014.

Try It

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Calculating Slope

The slope of a straight line between two points can be calculated in numerical terms. To calculate slope, begin by designating one point as the “starting point” and the other point as the “end point” and then calculating the rise over run between these two points.

Try It

Use the graph to find the slope of the line.

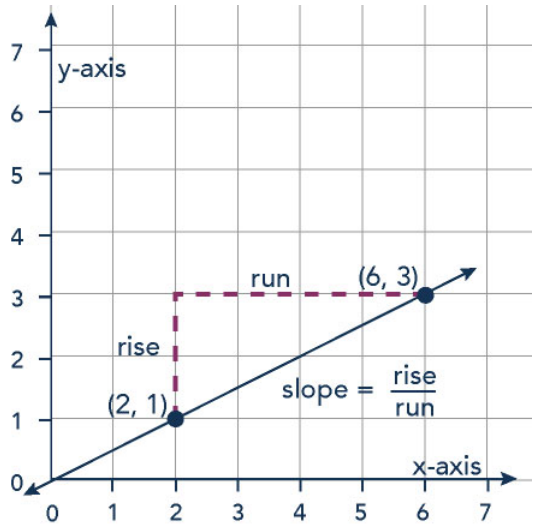


Figure 5.

[reveal-answer q="246780″]Show Answer[/reveal-answer]
[hidden-answer a="246780″]

Start from a point on the line, such as $(2,1)$ and move vertically until in line with another point on the line, such as $(6,3)$. The rise is 2 units. It is positive as you moved up.

Next, move horizontally to the point $(6,3)$. Count the number of units. The run is 4 units. It is positive as you moved to the right.

Then solve using the formula:

$$\displaystyle \text{Slope }=\frac{\text{rise}}{\text{run}}$$

so

$$\displaystyle \text{Slope}=\frac{2}{4}=\frac{1}{2}$$

Try It

These next questions allow you to get as much practice as you need, as you can click the link at the top of the first question ("Try another version of these questions") to get a new set of questions. Practice until you feel comfortable doing the questions and then move on.

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Graphs of economic relationships are not always straight lines. In this course, you will often see nonlinear (curved) lines, like Figure 6, which shows the relationship between quantity of output being produced and the cost of producing that output. As the quantity of output increases, the total cost increases at a faster rate. Table 1 shows the data behind this graph.

Table 1: Total Cost Curve

	Quantity of Output (Q)	Total Cost (TC)
	1	$1
	2	$4
	3	$9
“Point A”	4	$16
“Point B”	5	$25
	6	$36
	7	$49
	8	$64
	9	$81
	10	$100

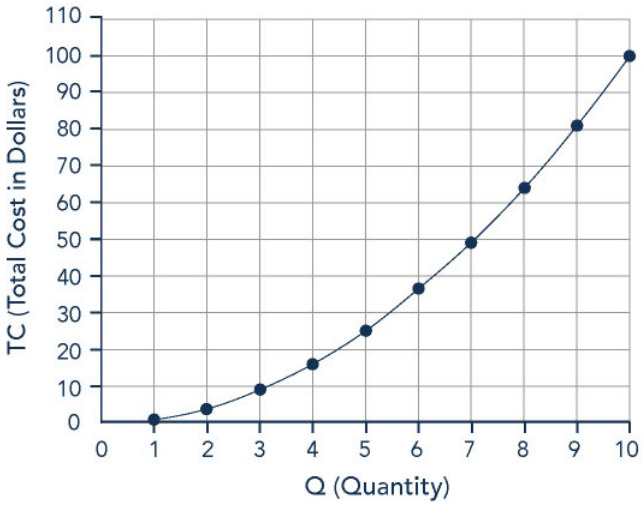


Figure 6. In this example, the total cost of production increase at a faster rate when the quantity of output increases.

We can interpret nonlinear relationships similarly to the way we interpret linear relationships. Their slopes can be positive or negative. We can calculate the slopes similarly also, looking at the rise over the run of a segment of a curve.

As an example, consider the slope of the total cost curve, above, between points A & B. Going from point A to point B, the rise is the change in total cost (i.e. the variable on the vertical axis):

$$\$25 – \$16 = \$9$$

Similarly, the run is the change in quantity (i.e. the variable on the horizontal axis):

$$5 – 4 = 1$$

Thus, the slope of a straight line between these two points would be 9/1 = 9. In other words, as we increase the quantity of output produced by one unit, the total cost of production increases by $9.

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Suppose the slope of a line were to increase. Graphically, that means it would get steeper. Suppose the slope of a line were to decrease. Then it would get flatter. These conditions are true whether or not the slope was positive or negative to begin with. A lower positive slope means a flatter upward tilt to the curve, which you can see in Figure 6 at low levels of output. A higher positive slope means a steeper upward tilt to the curve, which you can see at higher output levels.

A negative slope that is larger in absolute value (that is, more negative) means a steeper downward tilt to the line. A slope of zero is a horizontal line. A vertical line has an infinite slope.

Suppose a line has a larger intercept. Graphically, that means it would shift out (or up) from the old origin, parallel to the old line. This is shown in Figure 7, below, as the shift from the line labeled Y to the line labeled Y_1. If a line has a smaller intercept, it would shift in (or down), parallel to the old line.

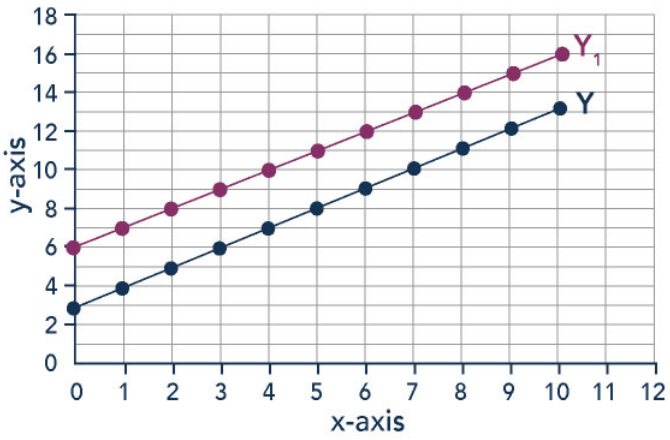


Figure 7. A larger y-intercept shifts the entire graph to cross the y-axis at a higher point.

Glossary

[glossary-page][glossary-term]negative slope: [/glossary-term]
[glossary-definition]indicates that two variables are negatively related; when one variable increases, the other decreases, and when one variable decreases, the other increases[/glossary-definition][glossary-term]positive slope:[/glossary-term][glossary-definition] indicates that two variables are positively related; when one variable increases, so does the other, and when one variable decreases, the other also decreases[/glossary-definition][glossary-term]slope: [/glossary-term]
[glossary-definition]the change in the vertical axis divided by the change in the horizontal axis[/glossary-definition][glossary-term]slope of zero: [/glossary-term][glossary-definition]indicates that there is no relationship between two variables; when one variable changes, the other does not change[/glossary-definition]
[/glossary-page]

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1.14: Types of Graphs

Learning Objectives

- Interpret economic information on a graph

Three types of graphs are used in this course: line graphs, pie graphs, and bar graphs. Each is discussed below.

Line Graphs

The graphs we've discussed so far are called **line graphs**, because they show a relationship between two variables: one measured on the horizontal axis and the other measured on the vertical axis.

Sometimes it's useful to show more than one set of data on the same axes. The data in the table, below, is displayed in Figure 1, which shows the relationship between two variables: length and median weight for American baby boys and girls during the first three years of life. (The median means that half of all babies weigh more than this and half weigh less.) The line graph measures length in inches on the horizontal axis and weight in pounds on the vertical axis. For example, point A on the figure shows that a boy who is 28 inches long will have a median weight of about 19 pounds. One line on the graph shows the length-weight relationship for boys, and the other line shows the relationship for girls. This kind of graph is widely used by health-care providers to check whether a child's physical development is roughly on track.

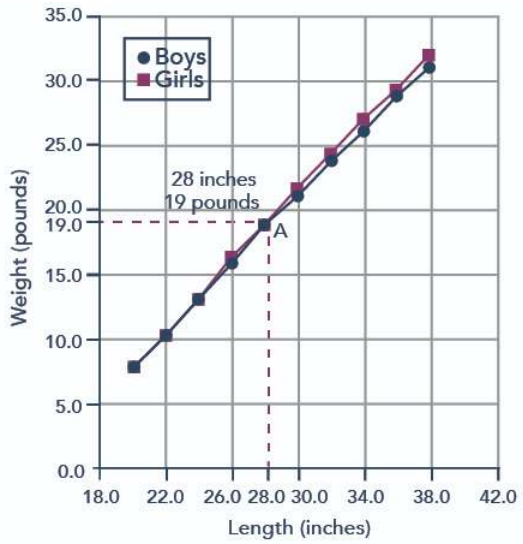


Figure 1. The Length-Weight Relationship for American Boys and Girls.

Length-to-Weight Relationship for American Boys and Girls

Boys from Birth to 36 Months		Girls from Birth to 36 Months	
Length (inches)	Weight (pounds)	Length (inches)	Weight (pounds)
20.0	8.0	20.0	7.9
22.0	10.5	22.0	10.5
24.0	13.5	24.0	13.2
26.0	16.4	26.0	16.0
28.0	19.0	28.0	18.8
30.0	21.8	30.0	21.2
32.0	24.3	32.0	24.0
34.0	27.0	34.0	26.2
36.0	29.3	36.0	28.9
38.0	32.0	38.0	31.3

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Not all relationships in economics are linear. Sometimes they are curves. Figure 2, below, presents another example of a line graph, representing the data from the table underneath. In this case, the line graph shows how thin the air becomes when you climb a mountain. The horizontal axis of the figure shows altitude, measured in meters above sea level. The vertical axis measures the density of the air at each altitude. Air density is measured by the weight of the air in a cubic meter of space (that is, a box measuring one meter in height, width, and depth). As the graph shows, air pressure is heaviest at ground level and becomes lighter as you climb. Figure 1 shows that a cubic meter of air at an altitude of 500 meters weighs approximately one kilogram (about 2.2 pounds). However, as the altitude increases, air density decreases. A cubic meter of air at the top of Mount Everest, at about 8,828 meters, would weigh only 0.023 kilograms. The thin air at high altitudes explains why many mountain climbers need to use oxygen tanks as they reach the top of a mountain.

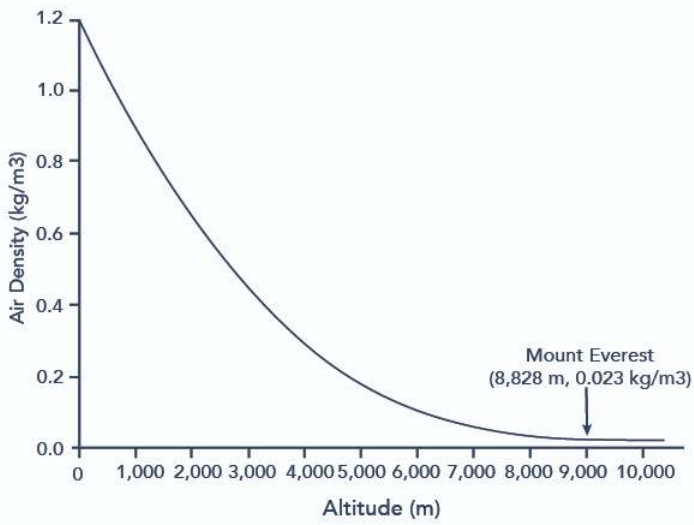


Figure 2. Altitude–Air-Density Relationship.

Altitude–to–Air-Density Relationship

Altitude (meters)	Air Density (kg/cubic meters)
0	1.200
500	1.093
1,000	0.831
1,500	0.678
2,000	0.569
2,500	0.484
3,000	0.415
3,500	0.357
4,000	0.307
4,500	0.231
5,000	0.182
5,500	0.142
6,000	0.100
6,500	0.085
7,000	0.066
7,500	0.051
8,000	0.041
8,500	0.025
9,000	0.022
9,500	0.019
10,000	0.014

The length-weight relationship and the altitude–air-density relationship in these two figures represent averages. If you were to collect actual data on air pressure at different altitudes, the same altitude in different geographic locations would have slightly different air density, depending on factors like how far you were from the equator, local weather conditions, and the humidity in the air. Similarly, in measuring the height and weight of children for the previous line graph, children of a particular height would have a range of different weights, some above average and some below. In the real world, this sort of variation in data is common. The task of a researcher is to organize that data in a way that helps to understand typical patterns. The study of statistics, especially when combined with computer statistics and spreadsheet programs, is a great help in organizing this kind of data, plotting line graphs, and looking for typical underlying relationships. For most economics and social science majors, a statistics course will be required at some point.

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One common line graph is called a **time series**, in which the horizontal axis shows time and the vertical axis displays another variable. Thus, a time-series graph shows how a variable changes over time. Figure 3 shows the unemployment rate in the United States since 1975, where unemployment is defined as the percentage of adults who want jobs and are looking for a job, but cannot find one. The points for the unemployment rate in each year are plotted on the graph, and a line then connects the points, showing how the unemployment rate has moved up and down since 1975. With a graph like this, it is easy to spot the times of high unemployment and of low unemployment.

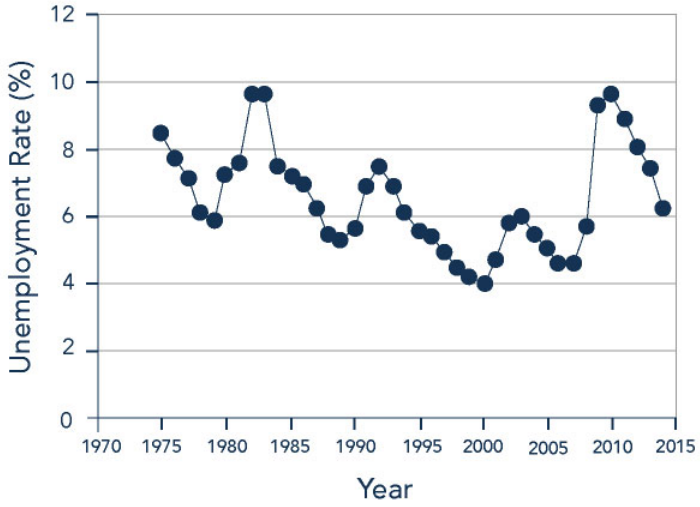


Figure 3. U.S. Unemployment Rate, 1975–2014.

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Pie Graphs

A **pie graph** (sometimes called a pie chart) is used to show how an overall total is divided into parts. A circle represents a group as a whole. The slices of this circular “pie” show the relative sizes of subgroups.

Figure 4 shows how the U.S. population was divided among children, working-age adults, and the elderly in 1970, 2000, and what is projected for 2030. The information is first conveyed with numbers in the table, below, and then in three pie charts.

Table 3. U.S. Age Distribution, 1970, 2000, and 2030 (projected)

Year	Total Population	19 and Under	20–64 years	Over 65
1970	205.0 million	77.2 (37.6%)	107.7 (52.5%)	20.1 (9.8%)
2000	275.4 million	78.4 (28.5%)	162.2 (58.9%)	34.8 (12.6%)
2030	351.1 million	92.6 (26.4%)	188.2 (53.6%)	70.3 (20.0%)

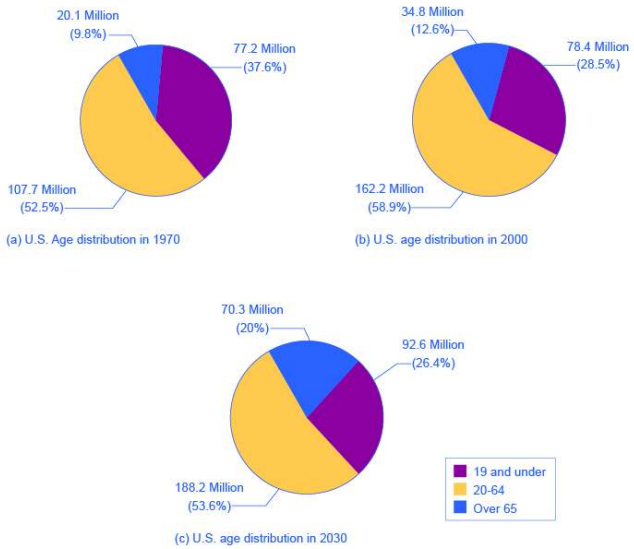


Figure 4. Pie Graphs of the U.S. Age Distribution (numbers in millions).

In a pie graph, each slice of the pie represents a share of the total, or a percentage. For example, 50% would be half of the pie and 20% would be one-fifth of the pie. The three pie graphs in Figure 4 show that the share of the U.S. population 65 and over is growing. The pie graphs allow you to get a feel for the relative size of the different age groups from 1970 to 2000 to 2030, without requiring you to slog through the specific numbers and percentages in the table. Some common examples of how pie graphs are used include dividing the population into groups by age, income level, ethnicity, religion, occupation; dividing different firms into categories by size, industry, number of employees; and dividing up government spending or taxes into its main categories.

Bar Graphs

A **bar graph** uses the height of different bars to compare quantities. The table, below, lists the 12 most populous countries in the world. Figure 5 provides this same data in a bar graph. The height of the bars corresponds to the population of each country. Although you may know that China and India are the most populous countries in the world, seeing how the bars on the graph tower over the other countries helps illustrate the magnitude of the difference between the sizes of national populations.

Table 4. Leading 12 Countries
of the World by Population

Country	Population
China	1,369
India	1,270
United States	321
Indonesia	255
Brazil	204
Pakistan	190
Nigeria	184
Bangladesh	158
Russia	146
Japan	127
Mexico	121
Philippines	101

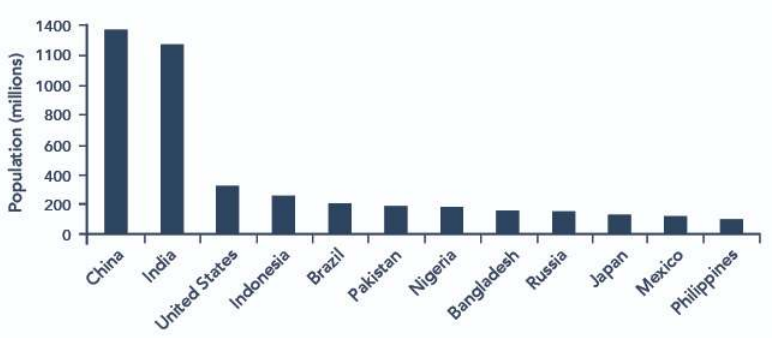


Figure 5. The graph shows the 12 countries of the world with the largest populations. The height of the bars in the bar graph shows the size of the population for each country.

Bar graphs can be subdivided in a way that reveals information similar to that we can get from pie charts. Figure 6 offers three bar graphs based on the information from Figure 4 about the U.S. age distribution in 1970, 2000, and 2030. Figure 6 (a) shows three bars for each year, representing the total number of persons in each age bracket for each year. Figure 6 (b) shows just one bar for each year, but the different age groups are now shaded inside the bar. In Figure 6 (c), still based on the same data, the vertical axis measures percentages rather than the number of persons. In this case, all three bar graphs are the same height, representing 100 percent of the population, with each bar divided according to the percentage of population in each age group. It is sometimes easier for a reader to run his or her eyes across several bar graphs, comparing the shaded areas, rather than trying to compare several pie graphs.

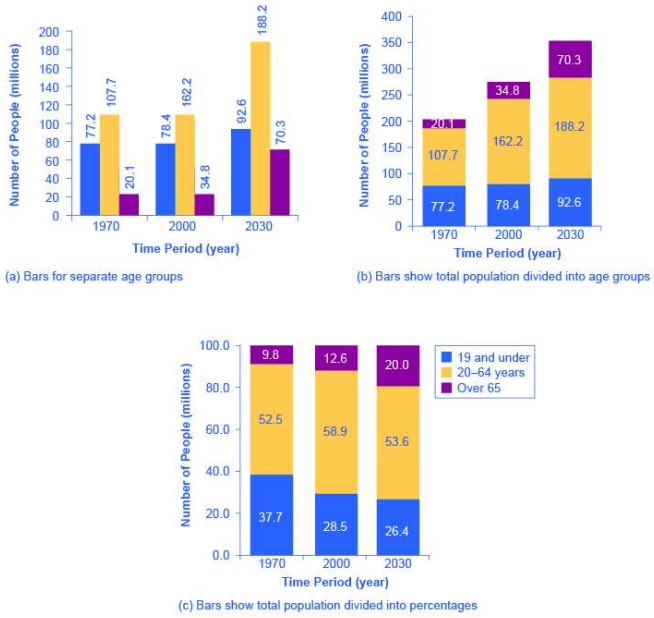


Figure 6. U.S. Population with Bar Graphs.

Figure 5 and Figure 6 show how the bars can represent countries or years, and how the vertical axis can represent a numerical or a percentage value. Bar graphs can also compare size, quantity, rates, distances, and other quantitative categories.

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Comparing **Line Graphs, Pie Charts, and Bar Graphs**

Now that you are familiar with pie graphs, bar graphs, and line graphs, how do you know which graph to use for your data? Pie graphs are often better than line graphs at showing how an overall group is divided. However, if a pie graph has too many slices, it can become difficult to interpret.

Bar graphs are especially useful when comparing quantities. For example, if you are studying the populations of different countries, as in Figure 5, bar graphs can show the relationships between the population sizes of multiple countries. Not only can it show these relationships, but it can also show breakdowns of different groups within the population.

A line graph is often the most effective format for illustrating a relationship between two variables that are both changing. For example, time-series graphs can show patterns as time changes, like the unemployment rate over time. Line graphs are widely used in economics to present continuous data about prices, wages, quantities bought and sold, the size of the economy.

Glossary

[glossary-page][glossary-term]bar graph:[/glossary-term]
[glossary-definition]shows data as vertical bars; the height of different bars are used to compare quantities[/glossary-definition]
[glossary-term]line graph:[/glossary-term][glossary-definition]shows a relationship between two variables: one measured on the horizontal axis and the other measured on the vertical axis[/glossary-definition][glossary-term]pie graph:[/glossary-term][glossary-definition]used to show how an overall total is divided into parts. A circle represents a group as a whole and slices of this circular “pie” show the relative sizes of subgroups. Also called a pie chart[/glossary-definition][glossary-term]time series:[/glossary-term]
[glossary-definition]type of line graph in which the horizontal axis shows time and the vertical axis displays another variable. Thus, a time-series graph shows how a variable changes over time [/glossary-definition][/glossary-page]

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1.15: Putting It Together- Economic Thinking

The Cost of Waiting in Line

Given your new understanding of economic concepts, let's revisit the example at the beginning of this module: the experience of taking a flight and feeling like others have special privileges that you don't have.

In our example, you waited in line at the security checkpoint for much longer than those who went through the express line. Let's assume that you waited in line for one hour and 10 minutes, while those with express access were able to get through security in just 10 minutes. What is the cost of one hour of your time? What is the cost of a ticket that gets you into the the express lane? Did you make the right choice?

Let's return to the concept of opportunity cost. Remember, opportunity cost indicates what must be given up to obtain something that's desired.

You chose to wait in line rather than buying a ticket that would allow you to use the express lane. It may not have seemed like a choice, but you did choose to buy a less expensive ticket—instead of paying more for one would have gotten you into the express line. How much more money would you have to pay for that ticket?



Depart	Arrive	Flight #	Routing	Travel Time	Business Select $596 - $605	Anytime $568 - $577	Wanna Get Away $139 - $276
6:00 AM	3:45 PM	1415 1472	1 stop Change Planes DEN	6h 45m	$605	$577	$276

On a flight from Los Angeles to Baltimore, the business select fare is $605. This is the fare that permits access to the express security lane. The lowest fare is $276. The difference is:

$$\$605 - \$276 = \$329$$

In other words, you chose to wait in line for one hour in order to save the $329 that you would have had to spend for a business select ticket. When we think of this in terms of opportunity cost, you now have some way to measure your decision: you have a firm number that can be compared against the cost of an alternative.

The Full Cost of Your Time

Let's consider monetary costs alone. If you had worked at a job for one more hour—instead of waiting in the security line—you could have earned an additional $20. That choice would have meant earning more money, but you would have had to spend far more for a business select ticket than you made in an hour. Since the $329 cost of that ticket is so much greater than the $20 you might have earned, the decision to wait in line for an hour (as opposed to working one hour more) makes good sense when comparing the monetary cost.

But remember, *opportunity cost is the value of the next best alternative*, and there are likely ways that you spend your time that you value more than money. Perhaps getting through security more quickly will enable you to sit down in a quiet café, enjoy a cup of tea, and avoid the stress you feel when you are rushed. There is a real value that you have given up.

Or, what if you are struggling to stay caught up on your schoolwork and an hour of study makes the difference between getting a good grade on an important test or not? If it's a test that has a big impact on your grade or academic record, then an hour might be incredibly valuable.

In other words, for any individual, the opportunity cost may simply be the lost money from work, or it may be peace of mind, or it may be an hour of study time—or something altogether different. Whichever one of the alternatives has the greatest value to you is your opportunity cost for one hour in line.

Does It Ever Make Sense to Buy Time?

Obviously an hour of time has a different opportunity cost for every individual. Let's take a minute to look at a graph of hourly wages and see if it helps us think about the opportunity cost.



On any flight, passengers with a higher hourly wage are more likely to purchase a select ticket that permits them to bypass security lines and board early. For some groups of passengers, the time is more valuable than the money. Still, you will note that some passengers are willing to spend more than their hourly wage to avoid waiting in line.

The definition of opportunity cost is quite specific: it's the value of the next best alternative. However, every individual values time, money, convenience, peace of mind, and other factors differently.

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1.16: Discussion- Is Economics a Science?

Respond to the following prompts in a post with a minimum of 200 words, then comment on at least TWO other posts.

- First, introduce yourself to your classmates. Where are you from? What are things you enjoy? What are your academic goals, and why are you taking this class? What are you most excited to learn about in economics?
- Is economics a science? Why, or why not? As part of your response and explanation, include the definitions of “science” and “economics” as you understand them.

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1.17: Assignment- Problem Set — Economic Thinking

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CHAPTER OVERVIEW

2: Choice in a World of Scarcity

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2.2: Introduction to the Cost of Choices
2.3: Budget Constraints and Choices
2.4: Calculating Opportunity Cost
2.5: Learn By Doing- Budget Constraints and Opportunity Cost
2.6: Introduction to the Production Possibilities Frontier
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2.1: Why It Matters- Choice in a World of Scarcity

Why learn to think like an economist?



As you now know, the study of economics is about choices that are made by individuals and entities, given the fact that we can never have enough. You might not argue that you don't have enough time or money, for instance, but why might you want to think about that in economic terms? Let's look at one situation in which the choices you make today—with limited time and money—have an impact on the choices available to you in the future.

It's generally true that the higher the educational degree a person has, the higher the salary he or she will earn. So why aren't more people pursuing higher degrees? The short answer: choices and trade-offs.

In 2012, the average annual salary for a full-time U.S. worker over age twenty-five with a master's degree was $67,600. Compare that to annual earnings for a full-time worker over twenty-five with no higher than a bachelor's degree: $55,432 a year. What about those with no higher than a high school diploma? They earn just $33,904 in a year. In other words, says the U.S. Bureau of Labor Statistics (BLS), earning a bachelor's degree boosted salaries 63 percent above what you would have earned if you had stopped your education after high school. A master's degree yields a salary almost double that of a high school diploma.

What are your educational goals? Do you plan to complete a bachelor's degree? A master's degree? Given the salary data, shouldn't everyone pursue a master's degree? When you made your own educational plans and goals, perhaps you were motivated by the potential for financial returns later on—i.e., the expectation that a higher degree would lead to a higher-paid job or career. But what other factors did you consider? Perhaps you also thought about the time and cost of education and the other things you like to do when you aren't studying. Other people, it turns out, also think about these things when deciding whether or not to pursue college.

Considering salary data alone, you might expect a lot of people to choose to attend college and at least earn a bachelor's degree. In fact, in 2012, the BLS reported that while nearly 88 percent of the U.S. population had a high school diploma, only 31 percent had a bachelor's degree, and only 8 percent had earned a master's degree.

For the majority of Americans, the time, money, and effort required to earn a degree is too great, in spite of the resulting salary benefits. In recognition of these barriers, state and federal governments have created programs such as the Pell Grant program to help students pay the financial costs of going to college. However, these programs don't cover the opportunity costs that are often the most pressing concern for students. For example, the opportunity cost of lost income that could be used to support a student's family might be a significant factor.

So, now that you're in college, how can you make the best decision about which level of education to pursue? Perhaps more important, how can you be realistic about your scarce resources and develop a plan that provides the greatest benefit to you?

In this module we will look more closely at the idea of choices and trade-offs, revisit the concept of opportunity cost, and learn how to calculate it. This will help you assign dollar amounts to your choices and understand why your decision to pursue a college

degree—in spite of the opportunity costs—is one of the most important decisions you can make toward improving your financial future.

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2.2: Introduction to the Cost of Choices

What you'll learn to do: explain the cost of choices and trade-offs



In the previous module we introduced the concepts of scarcity, monetary cost, and opportunity cost. This section focuses on the calculation of opportunity costs, or the cost of choosing one thing over another. For example, what alternatives do you give up by choosing to take a new job, or to go out with friends on the weekend? This section will help to understand the consequences of these trade-offs in more concrete terms.

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2.3: Budget Constraints and Choices

Learning Objectives

- Explain how budget constraints impact choices

Budget Constraint Framework



Figure 1.Trade-offs. Gas money or food money?

For most of us, the idea of scarcity and trade-offs is something we experience in a very real way when it comes to our own budget constraints. Most of us have a limited amount of money to spend on the things we need and want. Another kind of budget constraint is time. For instance, as a student, you only have twenty-four hours in the day to study, eat, sleep, and check Facebook. An hour spent studying economics is an hour that can't be used for sleep or play (or something else). As a result, you have to make choices, and every choice involves trade-offs.

In economics, a **budget constraint** refers to all possible combinations of goods that someone can afford, given the prices of goods and the income (or time) we have to spend.

Take the following example of someone who must choose between two different goods: Charlie has $10 in spending money each week that he can allocate between bus tickets for getting to work and the burgers he eats for lunch. Burgers cost $2 each, and bus tickets are 50 cents each. Figure 2, below, shows Charlie's budget constraint ($10) and all the possible combinations of burgers and bus tickets he can afford if he spends all his money.

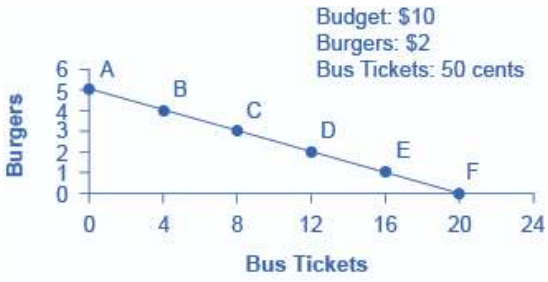


Figure 2. Charlie's budget constraint.

The vertical axis in the figure shows burger purchases, and the horizontal axis shows bus ticket purchases. If Charlie spends all his money on burgers, he can afford five per week. ($10 per week/$2 per burger = 5 burgers per week.) But if he does this, he won't be able to afford any bus tickets. This choice (zero bus tickets and 5 burgers) is shown by point A in the figure. Alternatively, if Charlie spends all his money on bus tickets, he can afford 20 per week. ($10 per week/$0.50 per bus ticket = 20 bus tickets per week.) Then, however, he will not be able to afford any burgers. This alternative choice (20 bus tickets and zero burgers) is shown by point F.

If Charlie is like most people, he will choose some combination that includes both bus tickets and burgers—that is, he will choose one of the points along the budget-constraint line that connects points A and F. Each point inside or on the budget constraint shows a combination of burgers and bus tickets that Charlie can afford. (A point inside the curve is definitely an option—it just means that Charlie isn't spending all his money.) Keep in mind that the curve represents the *maximum* number of burgers and bus tickets he can buy. Any point outside the constraint is not affordable, because it would cost more money than Charlie has in his budget. The slope of the budget constraint is determined by the relative price of burgers and bus tickets.

The budget constraint clearly shows the trade-off Charlie faces in choosing between burgers and bus tickets. Suppose he is currently at point D, where he can afford 12 bus tickets and 2 burgers. What would it cost Charlie for one more burger? It would be natural to answer $2, but that's not the way economists think. Instead, they ask: how many bus tickets would Charlie have to give up to get one more burger, while staying within his budget? The answer is four bus tickets. That is the true cost to Charlie of one more burger.

A budget-constraint diagram like the one above, with just two goods—burgers and bus tickets—is simple and not very realistic. After all, in an economy like ours (and Charlie's), people choose from thousands of goods. However, no matter how many goods a consumer has to choose from, every choice has an **opportunity cost**, i.e. the value of the other goods that aren't chosen. This is the point that carries over to the real world.

Try It

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Sunk Costs

In the budget constraint framework, all decisions involve what will happen next: What quantities of goods will you consume? How many hours will you work? How much will you save? Choices made or costs in the past are not taken into account. The budget constraint framework assumes that **sunkcosts**—costs incurred in the past that can't be recovered—should not affect the current decision.



Figure 3. Water Under the Bridge. Sunk costs are like "water under the bridge," an expression meaning that something is in the past and should be accepted because it can't be changed.

Suppose you pay $8 to see a movie, but after watching the first thirty minutes, you decide that it's awful. Should you stick it out and watch the rest because you paid for the ticket, or should you leave? The money you spent on the ticket is a sunk cost, and unless the theater manager is feeling generous, you won't get a refund. But staying for the rest of the movie means paying an opportunity cost in time. Your choice is whether to spend the next ninety minutes suffering through a rotten movie or do something —anything—else. The lesson of sunk costs is to forget about the money and time that is irretrievably gone and to focus, instead, on the costs and benefits of current and future options. A sunk cost is water under the bridge, so to speak.

For people and organizations alike, dealing with sunk costs can be frustrating and difficult. For one thing, it often means admitting an earlier error of judgment. Many companies find it hard to give up on a new product that's doing poorly because they've invested so much time and money in the product development and launch. But the lesson of sunk costs is to ignore them and make decisions based on what will happen in the future.

Try It

https://assessments.lumenlearning.co...sessments/7089
https://assessments.lumenlearning.co...sessments/7090

Learning Objectives

[glossary-page][glossary-term]budget constraint:[/glossary-term][glossary-definition]all possible consumption combinations of goods that someone can afford, given the prices of goods, when all income is spent; the boundary of the opportunity set [/glossary-definition][glossary-term]opportunity cost: [/glossary-term][glossary-definition]measures cost by what is given up in exchange; opportunity cost measures the value of the forgone alternative [/glossary-definition][glossary-term]sunk costs:[/glossary-term][glossary-definition]costs that are made in the past and cannot be recovered[/glossary-definition][/glossary-page]

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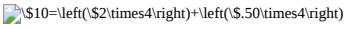
2.4: Calculating Opportunity Cost

Learning Objectives

- Calculate the opportunity costs of an action

It makes intuitive sense that Charlie can buy only a limited number of bus tickets and burgers with a limited budget. Also, the more burgers he buys, the fewer bus tickets he can buy. With a simple example like this, it isn't too hard to determine what he can do with his very small budget, but when budgets and constraints are more complex, equations can be used to demonstrate budget constraints and opportunity cost.

Very simply, when Charlie is spending his full budget on burgers and tickets, his budget is equal to the total amount that he spends on burgers plus the total amount that he spends on bus tickets. For example, if Charlie buys four bus tickets and four burgers with his $10 budget (point B on the graph below), the equation would be



You can see this on the graph of Charlie's budget constraint, Figure 1, below.

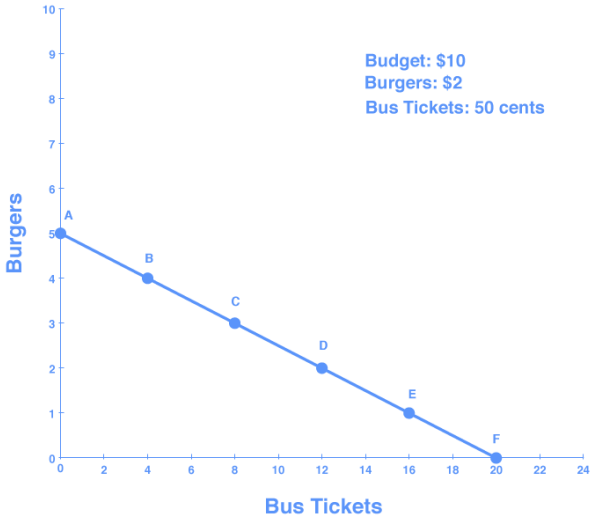
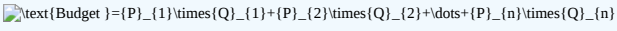


Figure 1. Charlie's Budget Constraint.

If we want to answer the question, "how many burgers and bus tickets can Charlie buy?" then we need to use the budget constraint equation.

Work It Out

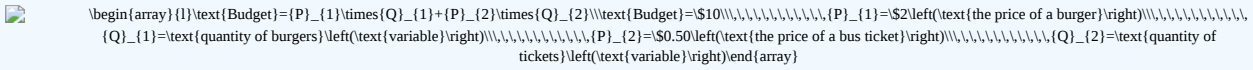
Step 1. The equation for any budget constraint is the following:



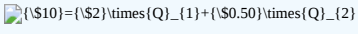
where P and Q are the price and respective quantity of any number, n, of items purchased and Budget is the amount of income one has to spend.

Step 2. Apply the budget constraint equation to the scenario.

In Charlie's case, this works out to be



For Charlie, this is



Step 3. Simplify the equation.

At this point we need to decide whether to solve for ${Q}_{1}$ or ${Q}_{2}$.

Remember, ${Q}_{1} = \text{quantity of burgers}$. So, in this equation ${Q}_{1}$ represents the number of burgers Charlie can buy depending on how many bus tickets he wants to purchase in a given week. ${Q}_{2}=\text{quantity of tickets}$. So, ${Q}_{2}$ represents the number of bus tickets Charlie can buy depending on how many burgers he wants to purchase in a given week.

We are going solve for ${Q}_{1}$.

$$\begin{array}{l}10=2Q_{1}+0.50Q_{2}\\10-2Q_{1}=0.50Q_{2}\\-2Q_{1}=-10+0.50Q_{2}\\\left(2\right)\left(-2Q_{1}\right)=\left(2\right)-10+\left(2\right)0.50Q_{2}\\\text{Clear decimal by multiplying everything by 2}\\-4Q_{1}=-20+Q_{2}\\Q_{1}=5-\frac{1}{4}Q_{2}\\\text{Divide both sides by}-4\end{array}$$

Step 4. Use the equation.

Now we have an equation that helps us calculate the number of burgers Charlie can buy depending on how many bus tickets he wants to purchase in a given week.

For example, say he wants 8 bus tickets in a given week. ${Q}_{2}$ represents the number of bus tickets Charlie buys, so we plug in 8 for ${Q}_{2}$, which gives us

$$\begin{array}{l}{Q}_{1}=5-\left(\frac{1}{4}\right)8\\{Q}_{1}=5-2\\{Q}_{1}=3\end{array}$$

This means Charlie can buy 3 burgers that week (point C on the graph, above).

Let's try one more. Say Charlie has a week when he walks everywhere he goes so that he can splurge on burgers. He buys 0 bus tickets that week. ${Q}_{2}$ represents the number of bus tickets Charlie buys, so we plug in 0 for ${Q}_{2}$, giving us

$$\begin{array}{l}{Q}_{1}=5-(\frac{1}{4})0\\{Q}_{1}=5\end{array}$$

So, if Charlie doesn't ride the bus, he can buy 5 burgers that week (point A on the graph).

If you plug other numbers of bus tickets into the equation, you get the results shown in Table 1, below, which are the points on Charlie's budget constraint.

Table 1.

Point	Quantity of Burgers (at $2)	Quantity of Bus Tickets (at 50 cents)
A	5	0
B	4	4
C	3	8
D	2	12
E	1	16
F	0	20

Step 4. Graph the results.

If we plot each point on a graph, we can see a line that shows us the number of burgers Charlie can buy depending on how many bus tickets he wants to purchase in a given week.

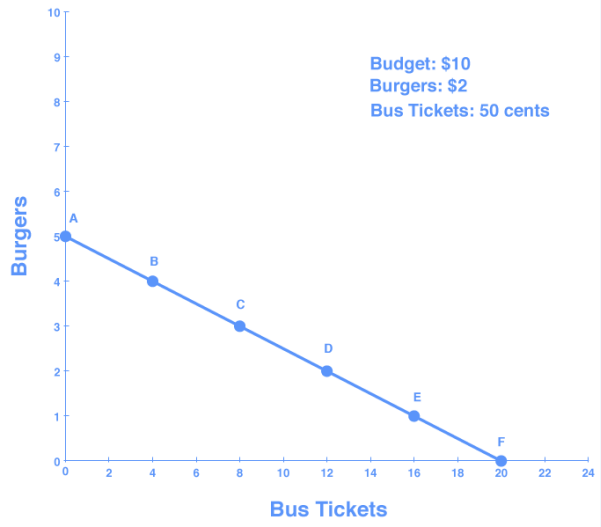
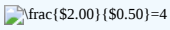


Figure 2. Charlie's Budget Constraint.

We can make two important observations about this graph. First, the slope of the line is negative (the line slopes downward from left to right). Remember in the last module when we discussed graphing, we noted that when when X and Y have a negative, or inverse, relationship, X and Y move in opposite directions—that is, as one rises, the other falls. This means that the only way to get more of one good is to give up some of the other.

Second, the slope is defined as the change in the number of burgers (shown on the vertical axis) Charlie can buy for every incremental change in the number of tickets (shown on the horizontal axis) he buys. If he buys one less burger, he can buy four more bus tickets. The slope of a budget constraint always shows the opportunity cost of the good that is on the horizontal axis. If Charlie has to give up lots of burgers to buy just one bus ticket, then the slope will be steeper, because the opportunity cost is greater.

This is easy to see while looking at the graph, but opportunity cost can also be calculated simply by dividing the cost of what is given up by what is gained. For example, the opportunity cost of the burger is the cost of the burger divided by the cost of the bus ticket, or



The opportunity cost of a bus ticket is:



Let's look at this in action and see it on a graph. What if we change the price of the burger to $1? We will keep the price of bus tickets at 50 cents.

A link to an interactive elements can be found at the bottom of this page.

Figure 3 (Interactive Graph). A Changing Budget Constraint.

Try It

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2.5: Learn By Doing- Budget Constraints and Opportunity Cost

Try It

Rather than have you read more about budget constraints and opportunity costs, we'd prefer to have you practice what you've done so far and see for yourself if you understand it.

These questions allow you to get as much practice as you need, as you can click the link at the top of the first question ("Try another version of these questions") to get a new version of the questions. Practice until you feel comfortable doing these questions.

Note that you'll use the information provided in the first question for all of the questions on this page.

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2.6: Introduction to the Production Possibilities Frontier

What you'll learn to do: illustrate society's trade-offs by using a production possibilities frontier (or curve)



Lyndon Baines Johnson: 36th President of the United States

In the previous sections of this module, we explored how individuals make choices about how to spend their budgets. In this section, we expand that idea to look at how societies make choices about what goods and services to produce.

During the 1960s, President Lyndon Johnson attempted two major, costly initiatives: launching the "War on Poverty," and expanding the Vietnam War. The results were not as nice as he expected because he was unable to completely tackle both issues, and he ignored what economists call the **production possibilities frontier** (also called the **production possibilities curve**). In brief, societies have limited resources so they face trade-offs, just as individuals do.

The production possibilities frontier (or PPF, for short) is a model of the economy as a whole, which shows all possible combinations of goods products or services that a society could produce, given the resources it has available.

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2.7: The Production Possibilities Frontier

Learning Objectives

- Explain the production possibilities frontier

Just as individuals cannot have everything they want and must instead make choices, society as a whole cannot have everything it might want, either. Economists use a model called the production possibilities frontier (PPF) to explain the constraints society faces in deciding what to produce.

As you read this section, you will see parallels between individual choice and societal choice. There are more similarities than differences, so for now focus on the similarities.

While individuals face budget and time constraints, societies face the constraint of limited resources (e.g. labor, land, capital, raw materials, etc.). Because at any given moment, society has limited resources, it follows that there's a limit to the quantities of goods and services it can produce. In other words, the products are limited because the resources are limited.

Suppose a society desires two products: health care and education. This situation is illustrated by the production possibilities frontier in Figure 1.

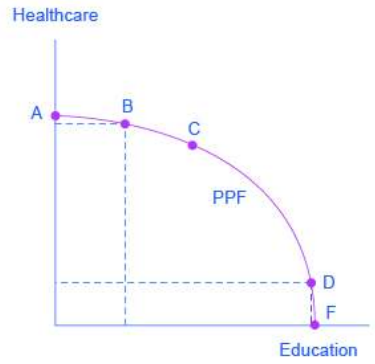


Figure 1. A production possibilities frontier showing health care and education.

Health care is shown on the vertical (or y) axis, and education is shown on the horizontal (or x) axis. Where does the PPF come from? It comes from the production processes for producing the two goods, and the limited amounts of resources available to use for that purpose. For example, suppose one teacher can teach 25 students in school. If society has a total of 10 teachers, education can be provided to a maximum of 250 students. We would say one teacher could "produce" 25 students worth of education using the education processes available.

Suppose a society allocated all of its resources to producing health care. That is certainly one possible way of allocating a society's resources, but it would mean there would be no resources left for education. This choice is shown in Figure 1 at point A. Similarly, the society could allocate all of its resources to producing education, and none to producing healthcare, as shown at point F. Alternatively, the society could choose to produce any combination of health care and education shown on the production possibilities frontier. In effect, the production possibilities frontier plays the same role for society as the budget constraint plays for an individual consumer. Society can choose any combination of the two goods on or inside the PPF. However, it does not have enough resources to produce outside the PPF.

Most importantly, the production possibilities frontier clearly shows the tradeoff between healthcare and education. Suppose society has chosen to operate at point B, and it's considering producing more education. Because the PPF is downward sloping from left to right, the only way society can obtain more education is by giving up some health care. That's the trade-off this society faces. Suppose it considers moving from point B to point C. What would be the opportunity cost for the additional education? The opportunity cost would be the health care that society has to give up.

Do you remember Charlie choosing combinations of burgers and bus tickets within his budget constraint? In effect, the production possibilities frontier plays the same role for society as the budget constraint plays for Charlie. Society can choose any combination

of the two goods on or inside the PPF, but it doesn't have enough resources to produce outside the PPF. Just as with Charlie's budget constraint, the opportunity cost is shown by the *slope* of the production possibilities frontier.

Try It

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https://assessments.lumenlearning.co...sessments/7093

Watch It

Take another look at the production possibilities frontier in this video about the imaginary "Econ Isle."

A link to an interactive elements can be found at the bottom of this page.

Differences between a Budget Constraint and a PPF

We're now ready to address the differences between society's PPF and an individual's budget constraint.

A budget constraint shows the different combinations of goods and services a consumer can purchase with their fixed budget. A production possibilities frontier shows the possible combinations of goods and services that a society can produce with its limited resources. The first difference between a budget constraint and a production possibilities frontier is that the PPF, because it's looking at societal choice, is going to have much larger numbers on the axes than those on an individual's budget constraint.

The most important difference between the two graphs, though, is that *a budget constraint is a straight line, while a production possibilities curve is typically bowed outwards*, i.e. concave towards the origin. The reason for this difference is pretty simple: the slope of a budget line is defined as the ratio of the prices of the two goods or services. No matter how many of each good or service a consumer buys, the prices stay the same. By contrast, the slope of a PPF is the cost to society of producing one good or service relative to the other good or service. When society reallocates resources from one product to another, the relative costs change, which means the slope of the PPF does also. Let's dig into this.

To understand why the PPF is curved, start by considering point A at the top left-hand side of the PPF. Considering the situation in Figure 1 (shown again below), suppose we have only two types of resources: doctors and teachers. At point A, all available resources (i.e. all the doctors and all the teachers) are devoted to providing health care and none is left for education. Say the doctors are practicing medicine and the teachers are helping out as best they can. This situation would be extreme and even ridiculous. For example, children are seeing a doctor every day, whether they're sick or not, but not attending school. People are having cosmetic surgery on every part of their bodies, but no high school or college education exists!

Now imagine that some of these resources are diverted from health care to education, so that the economy is at point B instead of point A. What type of resources are going to move to producing education? The doctors are good at medicine, but they're not particularly good at teaching, so it doesn't make sense for them to switch. The teachers, though, are good at education, and not very good at healthcare. After all, that's not what they were trained for. So it makes sense for teachers to be reallocated from healthcare to education. And when they move, the society doesn't lose much healthcare, because the teachers weren't very good at that. But the amount of education gained is great, because that's what teachers are trained for. What this means is that from point A to B, the decrease in healthcare is small, while the gain in education is large. Graphically, the rise is small and the run is large so the slope (which is the ratio of rise over run) is flat. In other words, the opportunity cost of education in terms of healthcare is low.

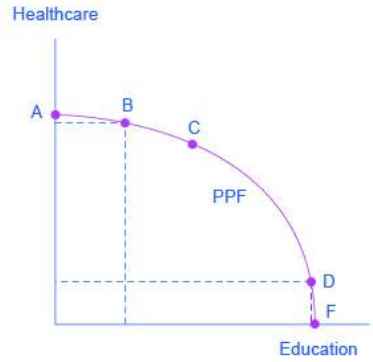


Figure 1 (shown again). A production possibilities frontier showing health care and education.

If we started at the other end of the PPF at point F and moved to point D, we would be moving doctors from teaching to healthcare with the result that the gain in healthcare would be large while the loss in education would be small (the same logic we used above). In short, the slope of the PPF from point F to D would be steep, and the opportunity cost of education in terms of healthcare would be high.

More generally, as society produces more and more of some good or service, the cost of production grows larger and larger relative to the cost of producing other goods or services. Thus, the slope of a PPF starts flat and becomes increasingly steeper. In the real world, of course, we have more than two goods and services, and we have more resources than just labor, but the general rule still holds.

There's another way to think about this. For consumers, there is only one scarce resource: budget dollars. As we choose more of one good and less of another, we are simply spending dollars on different items, but every dollar is worth the same in purchasing any item. For society, there are many scarce resources. In our simple example above, there were two different resources: doctors and teachers, and each resource is better at one job than at the other. In other words, each resource is not worth the same at producing different products. The general rule is when one is allocating only a single scarce resource, the trade-off (e.g. budget line) will be constant, but when there is more than one scarce resources, the trade-off will be increasingly costly (e.g. the PPF).

Watch It

Watch this video to see another explanation as to why the PPF is curved.

A link to an interactive elements can be found at the bottom of this page.

The Law of Diminishing Returns and the Curved Shape of the PPF



Figure 2. If you've ever pulled an all-nighter, you're probably familiar with the law of diminishing returns: as the night wears on and

you get tired, every additional hour you study is
a little less productive than the one before.

The lesson is not that society is likely to make an extreme choice like devoting no resources to education at point A or no resources to health at point F. Instead, the lesson is that the gains from committing additional marginal resources to education depend on how much is already being spent. If, on the one hand, very few resources are currently committed to education, then an increase in resources used can bring relatively large gains. On the other hand, if a large number of resources are already committed to education, then committing additional resources will bring relatively smaller gains.

This pattern is so common that it has been given a name: the **law of diminishing returns.** This law asserts that as additional increments of resources are devoted to a certain purpose, the marginal benefit from those additional increments will decline. For example, after not spending much at all on crime reduction, when a government spends a certain amount more, the gains in crime reduction could be relatively large. But additional increases after that typically cause relatively smaller reductions in crime, and paying for enough police and security to reduce crime to zero would be tremendously expensive.

The curve of the production possibilities frontier shows that as additional resources are added to education, moving from left to right along the horizontal axis, the initial gains are fairly large, but those gains gradually diminish. Similarly, as additional resources are added to health care, moving from bottom to top on the vertical axis, the initial gains are fairly large but again gradually diminish. In this way, the law of diminishing returns produces the outward-bending shape of the production possibilities frontier.

Try It

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Learning Objectives

[glossary-page][glossary-term]law of diminishing returns: [/glossary-term]
[glossary-definition]as additional increments of resources are devoted to a certain purpose, the marginal benefit from those additional increments will decline[/glossary-definition][glossary-term]production possibilities frontier (or curve): [/glossary-term][glossary-definition]a diagram that shows the productively efficient combinations of two products that an economy can produce given the resources it has available[/glossary-definition][/glossary-page]

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2.8: Productive Efficiency and Allocative Efficiency

Learning Objectives

- Use the production possibilities frontier to identify productive and allocative efficiency

Efficiency



Figure 1.Laundry Costs. An efficient washing machine operates at a low cost.

In a market-oriented economy with a democratic government, the choice of what combination of goods and services to produce, and thus where to operate along the production possibilities curve, will involve a mixture of decisions by individuals, firms, and government, expressing supplies and demands. However, economics can point out that some choices are unambiguously better than others. This observation is based on the idea of efficiency. In everyday parlance, *efficiency* refers to lack of waste. An inefficient washing machine operates at high cost, while an efficient washing machine operates at lower cost, because it's not wasting water or energy. An inefficient organization operates with long delays and high costs, while an efficient organization is focused, meets deadlines, and performs within budget.

The production possibilities frontier can illustrate two kinds of efficiency: productive efficiency and allocative efficiency. Figure 2, below, illustrates these ideas using a production possibilities frontier between health care and education.

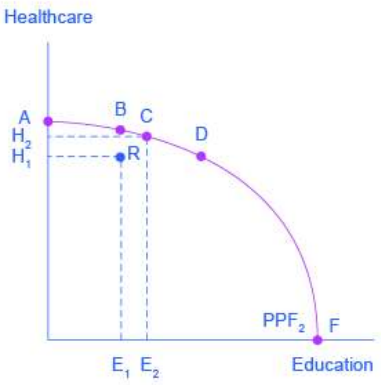


Figure 2.Productive and Allocative Efficiency. Points along the PPF display productive efficiency while those point R does not.

Productive efficiency means that, given the available inputs and technology, it's impossible to produce more of one good without decreasing the quantity of another good that's produced. All choices along the PPF in Figure 2, such as points A, B, C, D, and F, display productive efficiency. As a firm moves from any one of these choices to any other, either health care increases and education decreases or vice versa. This makes sense if you remember the definition of the PPF as showing the maximum amounts of goods a society can produce, given the resources it has. Thus, producing efficiently leads to maximum production, which is what the PPF shows.

However, any choice inside the production possibilities frontier is productively inefficient and wasteful because it's possible to produce more of one good, the other good, or some combination of both goods. Wasting scarce resources means the society is not

producing as well or as much as it could, so it is not operating on the PPF.

For example, point R is productively inefficient because it is possible at choice C to have more of both goods: education on the horizontal axis is higher at point C than point R (E_2 is greater than E_1), and health care on the vertical axis is also higher at point C than point R (H_2 is greater than H_1).

Any time a society is producing a combination of goods that falls *along* the PPF, it is achieving productive efficiency. When the combination of goods produced falls *inside* the PPF, then the society is productively inefficient.

Allocative efficiency means that the particular mix of goods a society produces represents the combination that society most desires. For example, often a society with a younger population has a preference for production of education, over production of health care. If the society is producing the quantity or level of education that the society demands, then the society is achieving allocative efficiency. Determining "what a society desires" can be a controversial question and is often discussed in political science, sociology, and philosophy classes, as well as in economics.

At the most basic level, allocative efficiency means that producers supply the quantity of each product that consumers demand. Only one of the productively efficient choices will be the allocative efficient choice for society as a whole. For example, in order to achieve allocative efficiency, a society with a young population will invest more in education. As the population ages, the society will shift resources toward health care because the older population requires more health care than education.

In the graph (Figure 2) above, a society with a younger population might achieve allocative efficiency at point D, while a society with an older population that required more health care might achieve allocative efficiency at point B.

We will return to this idea of allocative efficiency later when we learn more about applications of supply and demand.

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Why Society Must Choose

Every economy faces two situations in which it may be able to expand the consumption of all goods. In the first case, a society may discover that it has been using its resources inefficiently, in which case by improving efficiency and producing on the production possibilities frontier, it can have more of all goods (or at least more of some and less of none). In the second case, as resources grow over a period of years (e.g., more labor and more capital), the economy grows. As it does, the production possibilities frontier for a society will tend to shift outward, and society will be able to afford more of all goods.

However, improvements in productive efficiency take time to discover and implement, and economic growth happens only gradually. So, a society must choose between trade-offs in the present—as opposed to years down the road. For government, this process often involves trying to identify where additional spending could do the most good and where reductions in spending would do the least harm. At the individual and firm level, the market economy coordinates a process in which firms seek to produce goods and services in the quantity, quality, and price that people want. But for both the government and the market economy, in the short term, increases in production of one good typically mean offsetting decreases somewhere else in the economy.



Figure 3.Brazilian Sugar Cane. Stack of raw sugar cane

The PPF and Comparative Advantage

While every society must choose how much of each good it should produce, it doesn't need to produce every single good it consumes. Often, how much of a good a country decides to produce depends on how expensive it is to produce it versus buying it from a different country. As we saw earlier, the curve of a country's PPF gives us information about the trade-off between devoting resources to producing one good versus another. In particular, its slope gives the opportunity cost of producing one more unit of the good in the x-axis in terms of the other good (in the y-axis). Countries tend to have different opportunity costs of producing a specific good, either because of different climates, geography, technology, or skills.

Suppose two countries, the U.S. and Brazil, need to decide how much they will produce of two crops: sugar cane and wheat. Due to its climate, Brazil can produce a lot of sugar cane per acre but not much wheat. Conversely, the U.S. can produce a lot of wheat per acre, but not much sugar cane. Clearly, Brazil has a lower opportunity cost of producing sugar cane (in terms of wheat) than the U.S. The reverse is also true; the U.S. has a lower opportunity cost of producing wheat than Brazil. This can be illustrated by the PPF of each country, shown in Figure 4, below.

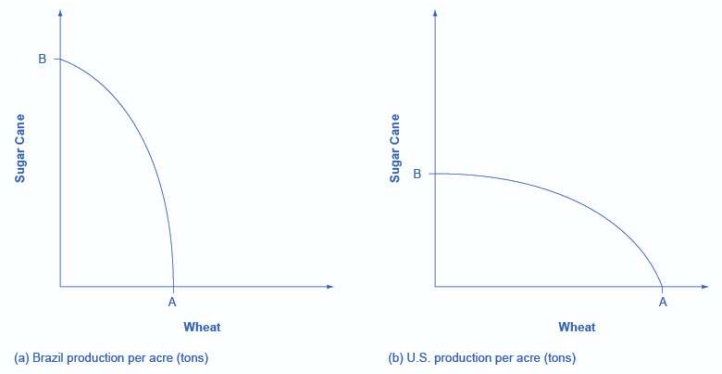


Figure 4. Brazil and U.S. production possibility frontiers.

When a country can produce a good at a lower opportunity cost than another country, we say that this country has a **comparative advantage** in that good. In our example, Brazil has a comparative advantage in sugar cane, and the U.S. has a comparative advantage in wheat. One can easily see this with a simple observation of the extreme production points in the PPFs. If Brazil devoted all of its resources to producing wheat, it would be producing at point A. If, however, it devoted all of its resources to producing sugar cane instead, it would be producing a much larger amount, at point B. By moving from point A to point B, Brazil would give up a relatively small quantity in wheat production to obtain a large production in sugar cane. The opposite is true for the U.S. If the U.S. moved from point A to B and produced only sugar cane, this would result in a large opportunity cost in terms of foregone wheat production.

The slope of the PPF gives the opportunity cost of producing an additional unit of wheat. While the slope is not constant throughout the PPFs, it is quite apparent that the PPF in Brazil is much steeper than in the U.S., and therefore the opportunity cost of wheat is generally higher in Brazil. In the module on international trade you will learn that countries' differences in comparative advantage determine which goods they will choose to produce and trade. When countries engage in trade, they specialize in the production of the goods in which they have comparative advantage and trade part of that production for goods in which they don't have comparative advantage in. With trade, goods are produced where the opportunity cost is lowest, so total production increases, benefiting both trading parties.

Learning Objectives

[glossary-page][glossary-term]allocative efficiency: [/glossary-term]
[glossary-definition]when the mix of goods being produced represents the mix that society most desires[/glossary-definition]
[glossary-term]productive efficiency: [/glossary-term][glossary-definition]given the available inputs and technology, it's impossible to produce more of one good without decreasing the quantity of another good that's produced[/glossary-definition]
[/glossary-page]

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2.9: Introduction to the Economic Way of Thinking

What you'll learn to do: explain the assumption of economic rationality, define marginal analysis, and differentiate between positive and normative reasoning.



This module is about how economists analyze issues and problems, which is sometimes referred to as the "economic way of thinking." In the previous sections of the module, we explored two common models used by economists to think about economic issues. Now we segue into introducing some specific features of economic thinking: economic rationality, marginal analysis, and positive vs. normative reasoning.

Economists assume that humans make decisions in predictable ways. They believe that, when making choices, people try to avoid costs and maximize benefits to themselves.This is what economists mean by rational decision-making.

Economists recognize that very few choices in the real world are "all or nothing." Most of the time, people have the choice to do a little more or a little less of something: Should you eat one more muffin? Should you study economics for another hour? Should you spend a little less money on gas? Economists use the word *marginal* to mean "additional" or "extra," and they use the term *marginal analysis* to describe how people make choices by comparing the benefits and costs of doing a bit more or a bit less.

Economists can make two kinds of arguments. Positive reasoning is scientific reasoning, based on theories and evidence. Policy decisions often employ normative reasoning, which is based on values. For reasons we will see later, it is important to be able to to differentiate between the two.

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2.10: Rationality and Self-Interest

Learning Objectives

- Define rationality in an economic context
- Provide examples of rational decision-making



Figure 1. Rodin's *The Thinker*. Maybe he's thinking about economic decisions?

If you say that someone is behaving "rationally," you probably mean that he or she is acting in a thoughtful, clear-headed way (as opposed to *irrationally*, which suggests that someone is acting emotionally or illogically). In the context of economics, the term *rationality* has a very specific meaning. It refers to an assumption that economists make about how people behave—remember that this is the starting point of all economics—*in the face of scarcity*. There simply aren't enough resources to satisfy all needs and wants. Charlie has only $10, he's hungry, and he needs to get to work. What will he do? An economist predicts that Charlie will behave in a predictable, rational manner, balancing costs against benefits to arrive at an action that maximizes his personal happiness or utility. As a result, he will choose a certain number of burgers and a certain number of bus tickets.

To put it differently, if an individual acts in an economically rational way, anything that increases the benefits or decreases the costs of some action is likely to increase the probability that the individual will choose that action. Anything that decreases the benefits or increases the costs will likely reduce the probability that the individual will choose that action.

Economists assume that people will make choices in their own self-interest. They will choose those things that provide the greatest personal benefit, and they'll avoid or forego those that aren't as personally valuable and compelling. That's what we mean by the **assumption of rationality**.

Do economists really believe that we only think of ourselves and don't ever try to benefit others? Not at all. The assumption that individuals are purely self-interested doesn't imply that individuals are greedy and selfish. People clearly derive satisfaction from helping others, so "self-interest" can also include pursuing things that benefit other people. One example is charitable behavior. When National Public Radio holds a fund drive, they often announce a situation where a benefactor has agreed to match the contributions made over a certain time period. If you pledge money during that time period, your action raises twice the amount you contribute. These matching fund situations tend to increase the amount of contributions, because people respond rationally, even when they are giving money to charity.

The assumption of rationality—also called the **theory of rational behavior**—is primarily a simplification that economists make in order to create a useful model of human decision-making.

Try It

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If you consider your own personal choices, you will probably find that they are quite complex. You are balancing what you want right now with options you want to have in the future. You probably value the people around you—friends, family, neighbors—and you may consider the impact that your choices have on them.

Setting aside the messy realm of personal choices for the time being, let's take a look at how decisions are made by consumers, by students, and by businesses in a world of economic rationality.

Rationality and Consumers

When a consumer is thinking about buying a product, what does he or she want? The theory of rational behavior would say that the consumer wants to maximize benefit and minimize cost.



Figure 2. Is it worth the cost to see a movie in the theater, or would you prefer to wait until you can buy the DVD or watch it on Netflix?

Let's look at a simple example. When a new movie is released, will you see it in the theater, or will you wait for it to be released on Netflix or on TV? If we consider only the monetary costs of your choice, a movie ticket might cost $10 and you will only be able to see that movie one time. If you wait, you can probably watch it as part of your monthly Netflix or cable subscription without spending any more than you would spend without watching the movie.

Why would you pay $10 to watch the movie in the theater? You might want to see it right away, when it is only showing in the theater. You might want the theater experience, with the big screen and high-quality image and sound. You will make a decision that is economically rational, based on the following consideration: "Is the benefit and enjoyment that I get from seeing the movie in a theater worth the $10 cost?"

As a consumer, you are making an economically rational decision about the costs and benefits.

Since we will build upon this later in the course, it's important to understand that this assumption creates a link between the cost of a product and the degree to which a consumer will want to buy it. As the cost of the product increases, it becomes less likely that the consumer will decide that the benefits of the purchase outweigh the costs.

Rationality and Students

How do students decide on a major? A number of things may factor into the decision, such as what type of career a student is interested in, the reputation of specific departments at the university a student is attending, and the student's preferences for specific fields of study. Let's take an example.

You go to college with the idea that you want to major in Business Management. During your first year, you discover that Business Analytics majors earn significantly higher salaries. This discovery increases the benefits in your mind of the Analytics major, and you decide to choose that major. You've just made an economically rational decision.

Rationality and Businesses

Businesses also have predictable behavior, but rather than seeking to maximize happiness or pleasure, they seek to maximize profits. When economists assume that businesses have a goal of maximizing profits, they can make predictions about how companies will react to changing business conditions.

For example, if wages in the United States increase, how will U.S. companies react? The rational reaction may be to move those jobs that can be performed elsewhere to countries with lower wages. This prediction is based on an oversimplification, and it might

not hold true in every case—individual businesses would obviously need to understand the full cost of moving certain work out of the country before doing so. But the decision would be made according to the impact on profit and would still be rational. If a company stands to earn more profit by moving some jobs overseas, then that's the result that economists would predict.

Rationality suggests that consumers will act to maximize self-interest and businesses will act to maximize profits. Both are taking into account the benefits of a choice, given the costs.

Learning Objectives

[glossary-page][glossary-term]assumption of rationality: [/glossary-term]
[glossary-definition]also called the theory of rational behavior, it is the assumption that people will make choices in their own self-interest[/glossary-definition][/glossary-page]

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2.11: Marginal Analysis

Learning Objectives

- Explain the importance of marginal analysis in economics
- Give examples of marginal cost and marginal benefit

A Little More or a Little Less

The budget constraint framework helps to illustrate that most choices in the real world are not about getting all of one thing or all of another—we rarely decide "all burgers" or "all bus tickets." Options usually fall somewhere on a continuum, and the choice usually involves marginal decision-making and marginal analysis.

Marginal decision-making means considering a little more or a little less than what we already have. We decide by using **marginal analysis**, which means comparing the costs and benefits of a little more or a little less.

It's natural for people to compare costs and benefits, but often we look at total costs and total benefits, when the best choice requires comparing how costs and benefits change from one option to another. In short, you might think of marginal analysis as "change analysis." Marginal analysis is used throughout economics. This subtle concept is easier to grasp with examples.

Marginal Cost



Figure 1. Charm Bracelet. What is the marginal cost of getting more silver heart charms? Should you buy just one charm for $4, or all of them for $12?

Generally speaking, **marginal cost** is the difference (or change) in cost of a different choice. From a consumer's point of view, marginal cost is the additional cost of one more item purchased. From a business's point of view, marginal cost is the additional cost of one more item produced.

Suppose you typically spend a week at the beach for vacation, but this year you earned an annual bonus from your job. Should you rent a beach house for one week or two? A one-week rental costs $2,000. A two-week rental costs $3,600. Holding everything else constant, which option is better? If you stay for two weeks, the cost is significantly higher: $3,600 versus $2,000. But consider the cost by week. The first week costs $2,000. The difference in cost between one week and two is $3,600 – $2,000, or $1,600. Thus, while the marginal cost of the first week's rental is $2,000, the marginal cost of the second week's rental is $1,600. This illustrates the key rule of marginal analysis: Marginal cost = the change in total cost from one option to another.

Consider another example. Imagine that you're out getting ice cream with your friends or family. You can choose whether to buy one, two, or three scoops of ice cream. One scoop costs $3.00, two scoops cost $5.00, and three scoops cost $7.00. This information is shown in the following table.

Scoops of Ice Cream	1	2	3
Total Cost	$3	$5	$7

What is the marginal cost of each scoop of ice cream? The marginal cost of the first scoop of ice cream is $3.00 because you have to pay $3.00 more to get one scoop of ice cream than you do to get zero scoops of ice cream. The marginal cost of the second scoop of ice cream is $2.00 because you only need to pay two more dollars to get two scoops than you need to pay to get one scoop. The marginal cost of the third scoop is also $2.00 because you would need to pay an additional two dollars to get that third scoop.

Scoops of Ice Cream	1	2	3
Marginal Cost	$3	$2	$2

Marginal costs sometimes go up and sometimes go down, but to get the clearest view of your options, you should always try to make decisions based on marginal costs, rather than total costs.

Try It

This next question allow you to get as much practice as you need, as you can click the link at the top of the question ("Try another version of this question") to get a new question. Practice until you feel comfortable doing the question and then move on.

[ohm_question]92668[/ohm_question]

Marginal Benefit

Generally speaking, **marginal benefit** is the difference (or change) in what you receive from a different choice. From a consumer's point of view, marginal benefit is the additional satisfaction of one more item purchased. From a business' point of view, marginal benefit is the additional revenues received from selling one more item.

Suppose you're considering membership at the local recreation center. The basic membership gives access to the swimming pool, while the full membership gives access to the swimming pool and the weight room. What is the difference between the two memberships? Since both give access to the pool, the marginal benefit of full membership is access to the weight room.

The amount of benefit a person receives from a particular good or service is subjective; one person may get more satisfaction or happiness from a particular good or service than another. For example, you might enjoy ice cream more than your friend who is allergic to dairy. The amount of benefit you get can also change. For example, you might enjoy the ice cream more on a hot day than on a cold day. This doesn't make it any less real, however.

Economic Rationality Revisited

How, then, do you decide on a choice? The answer is that you compare, to the best of your ability, the marginal benefits with the marginal costs. An economically rational decision is one in which the marginal benefits of a choice are greater than the marginal costs of the choice.

If we return to the recreation center example above, suppose that the basic membership is $30 per month, while the full membership is $40 per month. An economically rational decision-maker would ask, Is the marginal benefit (access to the weight room) worth the marginal cost (an extra $10 per month)? For some people, the answer will be yes. For others, it will be no. Either way, marginal analysis is an important part of economic rationality and good decision-making.

Try It

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Try It

These next questions allow you to get as much practice as you need, as you can click the link at the top of the first question ("Try another version of this question") to get a new set of questions. Practice until you feel comfortable doing the questions and then move on.

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Learning Objectives

[glossary-page][glossary-term]marginal analysis: [/glossary-term]
[glossary-definition]examination of decisions on the margin, meaning comparing costs of a little more or a little less[/glossary-definition][glossary-term]marginal benefit: [/glossary-term][glossary-definition]the difference (or change) in what you receive from a different choice[/glossary-definition][glossary-term]marginal cost: [/glossary-term]
[glossary-definition]the difference (or change) in cost of a different choice[/glossary-definition][/glossary-page]

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2.12: Positive and Normative Statements

Learning Objectives

- Distinguish between positive and normative statements

Economists engage in two distinct, but related activities. They conduct research on economic issues, e.g. to determine cause and effect. For example, why did unemployment increase rapidly in 2008 and 2009? Economists also make policy recommendations. For example, what should the federal government do in response to the increase in unemployment?

The first type of activity is economic science, based on theories and evidence, where researchers attempt to determine how the world (or at least the economy) works. This is called positive reasoning, and the conclusions are called **positive statements**. A relevant conclusion might be that because the level of employment is based on production in the economy (i.e. GDP), the increase in unemployment was because of the slowdown in GDP over that time period. This slowdown has been called the Great Recession.

The second type of activity is more subjective, and is inevitably based on the researcher's values. This is called normative reasoning, and the conclusions are called **normative statements**. A policy recommendation could be that since unemployed workers are not earning income, government should try to stimulate demand in the economy, so unemployed workers could get back to work. A different policy recommendation could be that stimulating demand could involve running a larger federal budget deficit, which future generations would have to pay back through higher taxes, so the government shouldn't try to stimulate demand. Which of these recommendations is the right one? That depends on your subjective values.

Positive Statements

Positive statements (and positive reasoning more generally) are objective. As such, they can be tested. These fall into two categories. One is a hypothesis, like "unemployment is caused by a decrease in GDP." This claim can be tested empirically by analyzing the data on unemployment and GDP. The other category is a statement of fact, such as "It's raining," or "Microsoft is the largest producer of computer operating systems in the world." Like hypotheses, such assertions can be shown to be correct or incorrect. A statement of fact or a hypothesis is a positive statement. Note also that positive statements can be false, but as long as they are testable, they are positive.

Normative Statements



Figure 1. Positive statement: it's raining.

Although people often disagree about positive statements, such disagreements can ultimately be resolved through investigation. There is another category of assertions, however, for which investigation can never resolve differences. A normative statement is one that makes a value judgment. Such a judgment is the opinion of the speaker; no one can "prove" that the statement is or is not correct. Here are some examples of normative statements in economics:

- We ought to do more to help the poor.
- People in the United States should save more for retirement.
- Corporate profits are too high.

These statements are based on the values of the person who makes them and can't be proven false.

Because people have different values, normative statements often provoke disagreement. An economist whose values lead him or her to conclude that we should provide more help for the poor will disagree with one whose values lead to a conclusion that we should not. Because no test exists for these values, these two economists will continue to disagree, unless one persuades the other

to adopt a different set of values. Many of the disagreements among economists are based on such differences in values and therefore are unlikely to be resolved.

It's not uncommon for people to present an argument as positive, to make it more convincing to an audience, when in fact it has normative elements. Opinion pieces in newspapers or on other media are good examples of this. That's why it's important to be able to differentiate between positive and normative claims.

Try It

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Watch It

Watch this short video to review the distinctions between positive and normative analysis.

A link to an interactive elements can be found at the bottom of this page.

Learning Objectives

[glossary-page][glossary-term]normative statement: [/glossary-term] [glossary-definition]conclusions based on value judgments that cannot be tested[/glossary-definition][glossary-term]positive statement: [/glossary-term][glossary-definition]conclusions based on logic and evidence that can be tested[/glossary-definition] [/glossary-page]

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2.13: Putting It Together- Choice in a World of Scarcity

The Challenging Budget Constraints of a Student

We began this module with a discussion of the annual salaries of full-time U.S. workers with different levels of education. Let's return to the very real economic issues that face most students when making decisions about their education.

First, we discussed the cost of choices and trade-offs and used the budget constraint model to demonstrate those costs. Each term, students make a trade-off between taking more credits in school and buying necessary items. Let's create a budget constraint model for Camila, a community college student who is struggling to cover the cost of education. First, let's assume that each credit hour costs $75. Camila wants to take 12 to 16 credits but also needs to pay for gas to drive between school, work, and other family responsibilities. Gas costs $3 per gallon. If she has a budget during the course of the academic term that allows her to spend a total of $1,500 on course credits and gas, what are Camila's options?

Exercises

We can use the budget constraint equation to answer this question.

Step 1. Apply the budget constraint equation to the scenario.

In Camila's case, this works out to be

$$\begin{array}{l}\text{Budget}={P}_{1}\times{Q}_{1}+{P}_{2}\times{Q}_{2}\\\text{Budget}=1500\\\,\,\,\,\,\,\,\,\,\,\,\,{P}_{1}=3\left(\text{price for a gallon of gas}\right)\\\,\,\,\,\,\,\,\,\,\,\,\,{Q}_{1}=\text{gallons of gas}\left(\text{variable}\right)\\\,\,\,\,\,\,\,\,\,\,\,\,{P}_{2}=75\left(\text{price per credit hour}\right)\\\,\,\,\,\,\,\,\,\,\,\,\,{Q}_{2}=\text{number of credit hours}\left(\text{variable}\right)\end{array}$$

For Camila, this is

$${1500}={3}\times{Q}_{1}+{75}\times{Q}_{2}$$

Step 2. Simplify the equation.

At this point we need to decide whether to solve for ${Q}_{1}$ or ${Q}_{2}$.

Remember, Camila was hoping to take at least 12 credit hours, so we know the value for ${Q}_{2}$. We will solve for ${Q}_{1}$ because, in this equation, it represents the number of gallons of gas Camila can pay for, depending on how many credit hours she takes during the academic term.

We are going solve for ${Q}_{1}$. First we will write the equation with the variables on the left to make solving easier:

$$3Q_1+75Q_2=1500 \tag{2.13.1}$$

$$\begin{array}{lll}3Q_1+75Q_2=1500\\\,3Q_1=1500-75Q_2\,\,\,\,\,\,\,\,\,\,\,\,\text{isolate Q_1 on one side}\\\,\large\frac{3Q_1}{3}=\frac{1500}{3}-\frac{-75Q_2}{3}\,\,\,\,\,\,\,\,\,\normalsize\text{divide everything by 3}\\\,Q_1=500-25Q_2\end{array}$$

Step 3. Use the equation.

We know that Camila hopes to take 12 credit hours during a term. ${Q}_{1}$ represents the number of credits she hopes to fund, so we plug in 12 for ${Q}_{2}$, which gives us

$$\begin{array}{l}{Q}_{1}=500-25(12)\\{Q}_{1}=500-300\\{Q}_{1}=200\end{array}$$

This means that Camila can buy 200 gallons of gas during the term she is taking 12 credit hours (point M on the graph, below).

If you plug other numbers of credit hours into the equation, you get the results shown in Table 1, below.

Table 1. Camila's Budget Constraint		
Point	Number of Credit Hours	Gallons of Gas
A	0	500
B	1	475
C	2	450
D	3	425
E	4	400
F	5	375
G	6	350
H	7	325
I	8	300
J	9	275
K	10	250
L	11	225
M	12	200
N	13	175
O	14	150
P	15	125
Q	16	100

Step 4. Graph the results.

If we plot each point on a graph, as below, we can see a line that shows us the number of credit hours that Camila can fund while still paying for gas.

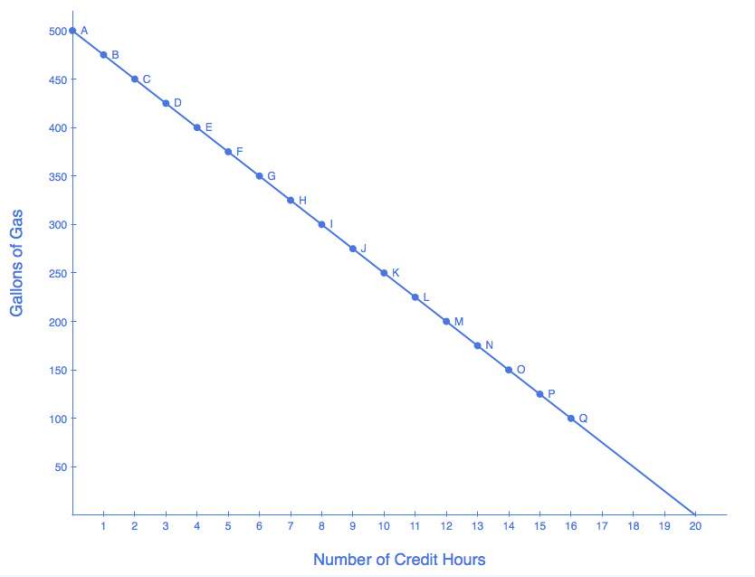


Figure 1. Camila's Budget Constraint.

Education and the Production Possibilities Curve

As state legislators allocate funding, they often make independent decision about the funding amount and approach for education and the funding amount and approach for corrections (or prisons). Economists recognize that these are not independent decisions. The production possibilities curve demonstrates that if society invests more in prisons, there are will be a reduction in the resources available to invest in education.

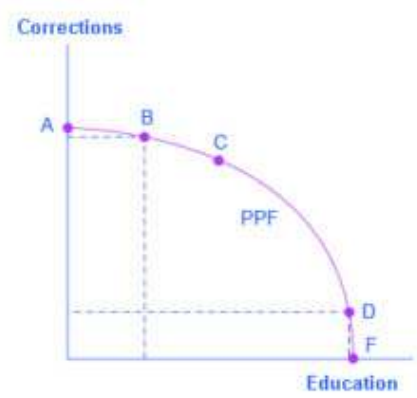


Figure 2. Education vs. Corrections Production Possibilities Frontier

The graph above demonstrates the trade-off between devoting resources to corrections and to education. If the society were to allocate all of its resources to corrections, it could produce at point A, but it would not have any resources to produce education. If it were to allocate all of its resources to education, it could produce at point F. Alternatively, society could choose to produce any combination of corrections and education shown on the production possibilities frontier.

Sometimes legislators don't recognize the direct trade-off between investing in education and investing in prisons, but inevitably economists will point out the connection, and the press will jump in and question the legislators' decision. In a world of scarcity, more spending in one necessarily means less to spend in others.

Should Society Invest in Prisons or Education?

As we consider the trade-offs between investments in prisons and education, is there a definitive "right" answer? Consider the following analysis by the Center on Budget and Policy Priorities:

Even as states spend more on corrections, they are underinvesting in educating children and young adults, especially those in high-poverty neighborhoods. At least 30 states are providing less general funding per student this year for K–12 schools than before the recession, after adjusting for inflation; in 14 states the reduction exceeds 10 percent. Higher education cuts have been even deeper: the average state has cut higher education funding per student by 23 percent since the recession hit, after adjusting for inflation. Eleven states spent more of their general funds on corrections than on higher education in 2013. And some of the states with the biggest education cuts in recent years also have among the nation's highest incarceration rates.

This is not sound policy. State economies would be much stronger over time if states invested more in education and other areas that can boost long-term economic growth and less in maintaining extremely high prison populations. The economic health of many low-income neighborhoods, which face disproportionately high incarceration rates, could particularly improve if states reordered their spending in such a way. States could use the freed-up funds in a number of ways, such as expanding access to high-quality preschool, reducing class sizes in high-poverty schools, and revising state funding formulas to invest more in high-poverty neighborhoods.[1]

While the analysis cited is thorough and logical, the report above includes a range of positive and normative statements. If you reread the analysis with that in mind, you will find examples of both.

Positive Statements

- At least 30 states are providing less general funding per student this year for K–12 schools than before the recession, after adjusting for inflation; in 14 states the reduction exceeds 10 percent.
- Higher education cuts have been even deeper: the average state has cut higher education funding per student by 23 percent since the recession hit, after adjusting for inflation.
- Eleven states spent more of their general funds on corrections than on higher education in 2013. And some of the states with the biggest education cuts in recent years also have among the nation's highest incarceration rates.

Normative Statements

- Even as states spend more on corrections, they are underinvesting in educating children and young adults, especially those in high-poverty neighborhoods.
- This is not sound policy.
- State economies would be much stronger over time if states invested more in education and other areas that can boost long-term economic growth and less in maintaining extremely high prison populations.

As you can see, your experience as a student affords you an important view into the trade-offs that are core to economics.

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1. http://www.cbpp.org/sites/default/files/atoms/files/10-28-14sfp.pdf ↵

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2.14: Discussion- Making Irrational Choices

Respond to the following prompts in a post with a minimum of 200 words, then comment on at least TWO other posts.

- Brainstorm common items that you think consumers pay too much for or that you think are overpriced (i.e. movie theater popcorn, brand name items, souvenirs,, etc.). Now think of something more specific, either something that you or someone who know has purchased. For example, I know someone with a baby who was traveling and purchased a small pouch of baby food for $2.00, when even more baby food could have been purchased in a jar for around $0.50.
- Write about your example, then use the principles you've learned about (like scarcity, opportunity cost, rationality, and marginal analysis) to explain why a person would make the decision to purchase that good.

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2.15: Assignment- Guns or Butter?

In this assignment, you will demonstrate your ability to draw a simple production possibilities curve given data on the quantity of one input (labor) and the amount of labor required to produce each of two outputs (guns and butter). You should also be able to identify the opportunity cost of one good in terms of the other as the slope of the PPC. You will explain your analysis of the figures to explain why it's not possible to produce combinations of the two goods outside the PPC.

Guns or Butter?

Suppose a nation has a total of 12 units of labor, which can be used to produce either guns or butter. One gun takes 6 units of labor to produce and 1 butter takes 2 units of labor to produce.

- Explain why scarcity exists in this economy. Use the data as evidence of your reasoning.
- What is the maximum quantity of guns that can be produced?
- What is the maximum quantity of butter than can be produced?
- Draw the nation's production possibility curve.
- What is the opportunity cost of guns in this nation?
- Explain why the nation can't produce both 3 guns and 4 butters.
- Explain why the nation shouldn't produce both 1 gun and 2 butters.

Criteria	Not Evident	Developing	Proficient	Distinguished	Weight
Explain why scarcity exists in this economy, and use data to justify					2
Calculate maximum quantity of guns that can be produced					1
Calculate maximum quantity of butter than can be produced					1
Draw the nation's production possibility curve					3
Describe the opportunity cost of guns in this nation					4
Explain why the nation can't produce both 3 guns and 4 butters					4
Explain why the nation shouldn't produce both 1 gun and 2 butters					4
Articulation of response (citations, grammar, spelling, syntax, or organization that negatively impact readability and articulation of main ideas.)					1
				Total:	20

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2.16: Assignment- Problem Set — Choice in a World of Scarcity

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- Choice in a World of Scarcity Problem Set

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CHAPTER OVERVIEW

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3.2: Learn By Doing- Calculating Equilibrium
3.3: Putting It Together- Supply and Demand
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3.1: Why It Matters- Supply and Demand

Why think about supply and demand?

Do you pay attention to the cost of a cup of coffee? Most people recognize that when they make coffee at home it's cheaper than buying a cup of coffee that someone else has made. You've probably also noticed that some coffee places are more expensive than others—a cup of coffee at Starbucks usually costs more than one at a gas station, for instance. Regardless of where you decide to buy coffee, the price can change dramatically.



Figure 1. Coffee Prices. Source: Trading Economics

While retailers make decisions about how much they will mark up the coffee drinks they sell, the underlying coffee prices all around the world are driven by supply and demand. Brazil accounts for 33 percent of all coffee production in the world, and in 2011 the country experienced a drought. Coffee trees had already been weakened by environmental factors, and the drought had a significant impact on production levels.

How did individuals react to this kind of shortage? Did the shortage have an impact on price? Take a look at the graph in Figure 1, above. You can see from the sharp spike in 2011 that a shortage in the supply of coffee did indeed have an impact on price. But what do we know about the demand for coffee during that time? Did coffee consumption levels fall? To answer these questions, we need to know more about how buyers and sellers interact in the marketplace. In short, we need to understand supply and demand.

In this section you'll learn about these key economic factors and the laws that govern them. Understanding supply and demand is not only essential to the study of economics—it may also help you be a better-informed consumer and make knowledgeable decisions about everything from your next cup of joe to your next job.

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3.2: Learn By Doing- Calculating Equilibrium

Try It

These questions allow you to get as much practice as you need, as you can click the link at the top of the first question ("Try another version of these questions") to get a new set of questions. Practice until you feel comfortable doing the questions and then move on.

Note that you will use the information provided in the first question for all of the questions on this page.

[ohm_question sameseed=1]92760-92761-92762-92763-92765-92766-92768[/ohm_question]

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3.3: Putting It Together- Supply and Demand

The demand and supply model emphasizes that prices are not set only by demand or only by supply, but by the interaction between the two. In 1890, the famous economist Alfred Marshall wrote that asking whether supply or demand determined a price was like arguing "whether it is the upper or the under blade of a pair of scissors that cuts a piece of paper." The answer is that both blades of the demand and supply scissors are always involved.

You'll remember that we started this module by considering changes in global coffee prices. Let's focus specifically on the drought of 2014 and see how the drought in Brazil affected supply and demand for coffee.

Now that we understand more about supply and demand, we can answer a few important questions: How does a drought impact supply? What impact will the quantity supplied have on the equilibrium price?



Figure 1. Coffee prices between 20017 and 2016. Source: Trading Economics.

In 2014, the coffee regions of Brazil experienced a serious drought. The lack of rain in Brazil's coffee-growing region delayed the tree-flowering period, which spans October and November. When the trees don't flower, they don't produce coffee. Weather conditions also affect the pollination of coffee trees that have already flowered: drought makes the blooms very delicate, which can cause them to fall off the tree. In 2014, the combined impact of these consequences meant a 13 percent drop in production from the previous year, to only 48 million 60-kilogram bags.[1]

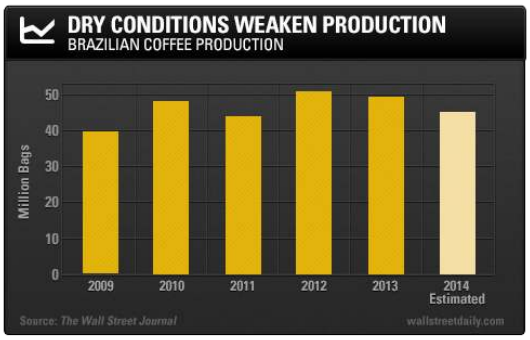
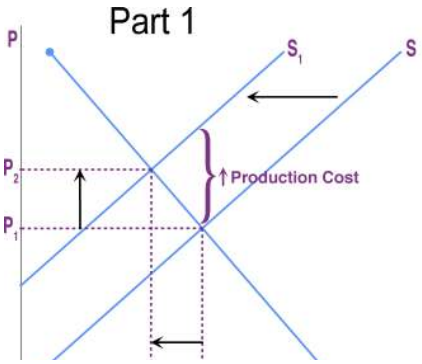


Figure 2. The change in the millions of bags of coffee production over time.

These are poor natural conditions for coffee growers, and they cause a reduction in the supply. Graphically, such a reduction means a shift to the left in the supply curve (shown in Figure 3, below), indicating that suppliers are providing less coffee at every price.



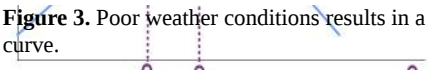


Figure 3. Poor weather conditions results in a leftward shift in the supply curve.

We can see that this shift in the supply curve will change the quantity supplied and the equilibrium price. At the original price (P_1), the decrease in supply causes a shortage—more people want coffee at that low price than the suppliers are able to provide. This drives up the price to a new equilibrium level (P_2). In short, a leftward shift in the supply curve causes a movement up the demand curve, resulting in a lower equilibrium quantity (Q_2) and a higher equilibrium price (P_2).

This impact is clear in an economic model like the graph above, but does it really affect consumers? Absolutely!—during this period, Starbucks raised its prices by 8 percent, and Folgers raised its prices by 9 percent. Coffee retailers were able to limit some of the impact of the rising coffee prices by drawing down their stock of green beans that were purchased before the drought and passing on some of the cost on to their customers as a higher price.[2] Some people—call them the coffee addicts—continue to drink coffee and pay the higher price. Others switch to tea or soft drinks. No government commission is needed to figure out how to adjust coffee prices, which companies will be allowed to process the remaining supply, which supermarkets in which cities will get how much coffee to sell, or which consumers will ultimately be allowed to drink the brew. Such adjustments in response to price changes happen all the time in a market economy, often so smoothly and rapidly that we barely notice them.

Think for a moment of all the seasonal foods that are available and inexpensive at certain times of the year, like fresh corn in midsummer, but more expensive at other times of the year. People alter their diets and restaurants alter their menus in response to these fluctuations in prices without fuss or fanfare. For both the U.S. economy and the world economy as a whole, markets—that is, demand and supply—are the primary social mechanism for answering the basic questions about what is produced, how it is produced, and for whom it is produced.

It's very common to see the impact of drought and other natural factors on supply, equilibrium quantity, and equilibrium price. The following video provides a brief example in the United States.

Watch It

A link to an interactive elements can be found at the bottom of this page.

1. http://www.wallstreetdaily.com/2014/10/21/coffee-prices-brazil-drought/ ↵
2. http://www.barrons.com/articles/rise-in-coffee-prices-nearing-peak-1444457073 ↵

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- Demand and Supply as a Social Adjustment Mechanism. **Authored by**: OpenStax College. **Located at**: https://cnx.org/contents/XAl2LLVA@7.2:yi4Ycqja@2/Demand-Supply-and-Efficiency. **License**: *Other*. **License Terms**: Standard YouTube License

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3.4: Discussion- Supply and Demand

Respond to the following prompts in a post with a minimum of 250 words, then comment on at least TWO other posts.

- Think of a relevant example in your own life of how a change in the market (including information, preferences, technology, price of alternative goods, regulations, taxes, etc.) has shifted either the supply or demand of a good. How did this change affect the market equilibrium for that good or service? Explain.
- Next, find a relatively recent news article (within the past year) to support your finding (the news search feature in Google is helpful with this). If you cannot find an article specific to your example, you may find an article about another similar good or service. Summarize the article and its findings, then include the URL in your discussion post.

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3.5: Assignment- Supply and Demand of Coffee

A key skill in economics is the ability to use the theory of supply and demand to analyze specific markets. In this week's assignment, you get a chance to demonstrate your ability to analyze the effects of several "shocks" to the market for coffee. Answer all parts of each of the scenarios below.

Scenario 1: Suppose that, as part of an international trade agreement, the U.S. government reduces the tariff on imported coffee. Will this affect the supply or the demand for coffee? Why? Which determinant of demand or supply is being affected? Show graphically with before- and after-curves on the same axes. How will this change the equilibrium price and quantity of coffee? Explain your reasoning.

Scenario 2: Suppose the National Institutes of Health publishes a study finding that coffee drinking reduces the probability of getting colon cancer. How do you imagine this will affect the market for coffee? Why? Which determinant of demand or supply is being affected? Show graphically with before- and after-curves on the same axes. How will this change the equilibrium price and quantity of coffee? Explain your reasoning.

Scenario 3: Combine parts 1 and 2. Suppose that the U.S. government reduces the tariff on imported coffee, and a reputable study is published indicating that coffee drinkers have lower rates of colon cancer. What will the combined impact be on the equilibrium price and quantity of coffee? Explain your reasoning and show graphically. Make sure you think this through carefully!

Criteria	Not Evident	Developing	Proficient	Distinguished	Weight
Explain how tariffs impact the supply and demand of coffee					4
Graphically show the impact of tariffs on supply and demand					3
Explain how the NIH study impacts the supply and demand of coffee					4
Graph how the NIH study impacts the supply and demand of coffee					3
Explain and show what would happen with reduced tariffs and the NIH study on coffee					6
				Total:	20

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3.6: Assignment- Problem Set — Supply and Demand

Click on the link to download the problem set for this module:

- Supply and Demand Problem Set

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3.7: Introduction to Economic Systems

What you'll learn to do: describe and differentiate between major economic systems



Think about what a complex system a modern economy is. It includes all production of goods and services, all buying and selling, all employment. The economic life of every individual is interrelated, at least to a small extent, with the economic lives of thousands or even millions of other individuals. Who organizes and coordinates this system? Who insures that, for example, the number of televisions a society produces is the same as the amount it needs and wants? Who insures that the right number of employees works in the electronics industry? Who insures that televisions are produced in the best way possible? How does it all get done?

The answer to these important questions depends on the kind of economic system a society uses.

In this section, you'll learn about the basic organizing principles of different types of economies. Understanding the characteristics of a competitive market, in particular, is an important foundation for understanding the mechanisms of supply and demand.

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3.8: Economic Systems

Learning Objectives

- Describe characteristics of market economies, including free and competitive markets
- Describe characteristics of a planned, or command, economy



Figure 1. Perhaps a picture of a planned economy?

Types of Economies

In the modern world today, there is a range of economic systems, from market economies to planned (or command) economies.

Market Economies

A **market** is any situation that brings together buyers and sellers of goods or services. Buyers and sellers can be either individuals or businesses. In a market economy, economic decision-making happens through markets. Market economies are based on private enterprise: the means of production (resources and businesses) are owned and operated by private individuals or groups of private individuals. Businesses supply goods and services based on demand. Which goods and services are supplied depends on what products businesses think will bring them the most profit. The more a product is demanded by consumers or other businesses, the higher the price businesses can charge, and so the more of the product will be supplied. Consumer demand depends on peoples' incomes. A person's income is based on his or her ownership of resources (especially labor). The more society values the person's output, the higher the income they will earn (think Lady Gaga or LeBron James).

Examples of free-market economies include Hong Kong, Singapore, and to a large extent, New Zealand, and the United States.

Free Markets

In a **market economy**, decisions about what products are available and at what prices are determined through the interaction of supply and demand. A **competitive market** is one in which there is a large number of buyers and sellers, so that no one can control the market price. A **free market** is one in which the government does not intervene in any way. A free and competitive market economy is the ideal type of market economy, because what is supplied is exactly what consumers demand.

Price controls are an example of a market that is not free. When government intervenes, the market outcomes will be different from those that would occur in a free and competitive market model. When markets are less than perfectly competitive (e.g., monopolistic), the market outcomes will also differ.

Try It

https://assessments.lumenlearning.co...sessments/7101

https://assessments.lumenlearning.co...sessments/7102

Planned (or Command) Economies



Figure 2. Ancient Egypt's command economy forced people to work on the building the pyramids.

Command economies operate very differently. In a **command economy**, economic effort is devoted to goals passed down from a ruler or ruling class. Ancient Egypt was a good example: a large part of economic life was devoted to building pyramids (like the one at the left), for the pharaohs. Medieval manor life is another example: The lord provided the land for growing crops and protection in the event of war. In return, vassals provided labor and soldiers to do the lord's bidding. In the last century, communist countries have employed command economies.

In a command economy, resources and businesses are owned by the government. The government decides what goods and services will be produced and what prices will be charged for them. The government decides what methods of production will be used and how much workers will be paid. Some necessities like health care and education are provided for free, as long as the state determines that you need them. With the collapse of the former Soviet Union in the 1990s, command economies fell out of favor as an economic system. Currently, only North Korea and Cuba have command economies.

The primary distinction between a free and command economy is the degree to which the government determines what can be produced and what prices will be charged. In a free market, these determinations are made by the collective decisions of the market itself (which is comprised of producers and consumers). Producers and consumers make rational decisions about what will satisfy their self-interest and maximize profits, and the market responds accordingly. In a planned economy, the government makes most decisions about what will be produced and what the prices will be, and consumers react passively to that plan.

Most economies in the real world are mixed; they combine elements of command and market systems. The U.S. economy is positioned toward the market-oriented end of the spectrum. Many countries in Europe and Latin America, while primarily market-oriented, have a greater degree of government involvement in economic decisions than in the U.S. economy. China and Russia, while they are closer now to having a market-oriented system than several decades ago, remain closer to the command-economy end of the spectrum.

Try It

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https://assessments.lumenlearning.co...sessments/7104

Watch It

The following Crash Course video provides additional information about the broad economic choices that countries make when they decide between planned and market economies. The narrators talk fast, so you'll need to listen closely and possibly watch the video a second time!

A link to an interactive elements can be found at the bottom of this page.

Economic systems determine the following:

- What to produce?
- How to produce it?
- Who gets it?

In a planned economy, government controls the factors of production:

- In a true communist economy, there is no private property—everyone owns the factors of production. This type of planned economy is called a *command economy*
- In a socialist economy, there is some private property and some private control of industry.

In a free-market (capitalist) economy, individuals own the factors of production:

- Businesses produce products.
- Consumers choose the products they prefer leading the companies that produce them to make more profit.

Even in free markets, governments should

- Maintain the rule of law
- Create public goods and services such as roads and education
- Step in when the market gets things wrong (e.g., setting minimum wage, establishing environmental standards)

Learning Objectives

[glossary-page][glossary-term]command economy: [/glossary-term]
[glossary-definition]an economy where economic decisions are passed down from government authority and where resources are owned by the government[/glossary-definition][glossary-term]competitive market: [/glossary-term][glossary-definition]is one in which there is a large number of buyers and sellers, so that no one can control the market price[/glossary-definition][glossary-term]free market:[/glossary-term][glossary-definition] a market in which the government does not intervene in any way[/glossary-definition][glossary-term]market economy:[/glossary-term][glossary-definition] an economy where economic decisions are decentralized, resources are owned by private individuals, and businesses supply goods and services based on demand[/glossary-definition][/glossary-page]

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3.9: Introduction to Demand

What you'll learn to do: explain the determinants of demand



Imagine that Ben & Jerry's has a promotion to discount the price of their ice cream next summer. What do you think will happen to the amount of Ben & Jerry's ice cream that people will want to buy? The likely result is that people will buy more ice cream. By the same token, if the price of the ice cream were to rise next summer, then ice cream purchases would likely fall. In this section, you will examine this "law of demand" and see why this simple concept is essential to understanding economics.

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3.10: What Is Demand?

Learning Objectives

- Explain demand and the law of demand
- Identify and explain a demand curve
- Create and interpret a demand curve using a data set



Figure 1. Demand for Gas. If the price of gasoline suddenly increases dramatically, fewer people will take to the roads. This is explained by the law of demand.

Demand for Goods and Services

Economists use the term **demand** to refer to the amount of some good or service consumers are willing and able to purchase at each price. Demand is based on needs and wants—a consumer may be able to differentiate between a need and a want, but from an economist's perspective, they are the same thing. Demand is also based on ability to pay. If you can't pay for it, you have no effective demand.

What a buyer pays for a unit of the specific good or service is called the **price**. The total number of units purchased at that price is called the **quantity demanded**. A rise in the price of a good or service almost always decreases the quantity of that good or service demanded. Conversely, a fall in price will increase the quantity demanded. When the price of a gallon of gasoline goes up, for example, people look for ways to reduce their consumption by combining several errands, commuting by carpool or mass transit, or taking weekend or vacation trips closer to home. Economists call this inverse relationship between price and quantity demanded the **law of demand**. The law of demand assumes that all other variables that affect demand are held constant.

An example from the market for gasoline can be shown in the form of a table or a graph. A table that shows the quantity demanded at each price, such as Table 1, is called a **demand schedule**. Price in this case is measured in dollars per gallon of gasoline. The quantity demanded is measured in millions of gallons over some time period (for example, per day or per year) and over some geographic area (like a state or a country).

Table 1. Price and Quantity Demanded of Gasoline	
Price (per gallon)	Quantity Demanded (millions of gallons)
$1.00	800
$1.20	700
$1.40	600
$1.60	550
$1.80	500
$2.00	460
$2.20	420

A **demand curve** shows the relationship between price and quantity demanded on a graph like Figure 2, below, with price per gallon on the vertical axis and quantity on the horizontal axis. *Note that this is an exception to the normal rule in mathematics that the independent variable (x) goes on the horizontal axis and the dependent variable (y) goes on the vertical. Economics is different from math!* Note also that each point on the demand curve comes from one row in Table 1. For example, the upper most point on the demand curve corresponds to the last row in Table 1, while the lower most point corresponds to the first row.

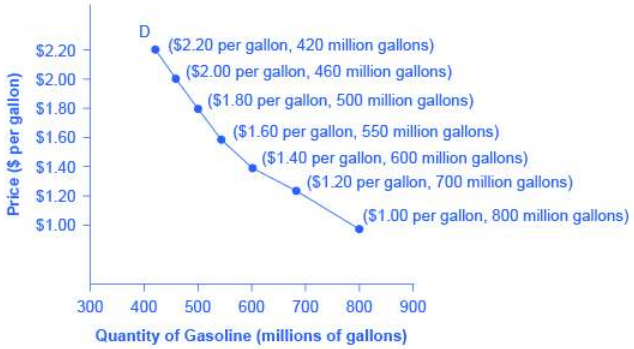


Figure 2. A Demand Curve for Gasoline (derived from the data in Table 1).

The demand schedule (Table 1) shows that as price rises, quantity demanded decreases, and vice versa. These points can then be graphed, and the line connecting them is the demand curve (shown by line D in the graph, above). The downward slope of the demand curve again illustrates the law of demand—the inverse relationship between prices and quantity demanded.

The demand schedule shown by Table 1 and the demand curve shown by the graph in Figure 2 are two ways of describing the same relationship between price and quantity demanded.

Try It

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https://assessments.lumenlearning.co...sessments/7106

Watch It

The demand curve shows how much of a good people are willing to buy at different prices. Watch this video to see an example of the demand for oil. When oil prices are high, fewer people are willing to pay the hefty price tag but some consumers, like airliners, depend so heavily on using oil for fuel, they are willing to pay a lot. Other low-value consumers will be less likely to pay for expensive oil, as they could find substitutes or alternatives.

A link to an interactive elements can be found at the bottom of this page.

Demand curves will look somewhat different for each product. They may appear relatively steep or flat, or they may be straight or curved. Nearly all demand curves share the fundamental similarity that they slope down from left to right. In this way, demand curves embody the law of demand: As the price increases, the quantity demanded decreases, and conversely, as the price decreases, the quantity demanded increases.

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Demand vs. Quantity Demanded

In economic terminology, *demand* is not the same as *quantity demanded*. When economists talk about demand, they mean the relationship between a range of prices and the quantities demanded at those prices, as illustrated by a demand curve or a demand schedule. When economists talk about quantity demanded, they mean only a certain point on the demand curve, or one quantity on the demand schedule. In short, demand refers to the curve and quantity demanded refers to the (specific) point on the curve.

What Factors Affect Demand?

We defined demand as the amount of some product that a consumer is *willing* and *able* to purchase at each *price*. This suggests at least two factors, in addition to price, that affect demand. “Willingness to purchase” suggests a desire to buy, and it depends on what economists call tastes and preferences. If you neither need nor want something, you won’t be willing to buy it. “Ability to purchase” suggests that income is important. Professors are usually able to afford better housing and transportation than students, because they have more income. The prices of related goods can also affect demand. If you need a new car, for example, the price of a Honda may affect your demand for a Ford. Finally, the size or composition of the population can affect demand. The more children a family has, the greater their demand for clothing. The more driving-age children a family has, the greater their demand for car insurance and the less for diapers and baby formula.

These factors matter both for demand by an individual and demand by the market as a whole. Exactly how do these various factors affect demand, and how do we show the effects graphically? To answer those questions, we need the *ceteris paribus* assumption.

The *Ceteris Paribus* Assumption

A *demand curve* or a *supply curve* (which we’ll cover later in this module) is a relationship between two, and only two, variables: price on the vertical axis and quantity on the horizontal axis. The assumption behind a demand curve or a supply curve is that no relevant economic factors, other than the product’s price, are changing. Economists call this assumption ***ceteris paribus***, a Latin phrase meaning “other things being equal.” Any given demand or supply curve is based on the *ceteris paribus* assumption that all else is held equal. Therefore, a demand curve or a supply curve is a relationship between two, and only two, variables *when all other variables are held equal*. If all else is not held equal, then the laws of supply and demand will not necessarily hold.

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WHEN DOES *CETERIS PARIBUS* APPLY?

Ceteris paribus is applied when we look at how changes in price affect demand or supply, but *ceteris paribus* can also be applied more generally. In the real world, demand and supply depend on more factors than just price. For example, a consumer’s demand depends on income, and a producer’s supply depends on the cost of producing the product. How can we analyze the effect on demand or supply if multiple factors are changing at the same time—say price rises and income falls? The answer is that we examine the changes one at a time, and assume that the other factors are held constant.

For example, we can say that an increase in the price reduces the amount consumers will buy (assuming income, and anything else that affects demand, is unchanged). Additionally, a decrease in income reduces the amount consumers can afford to buy (assuming price, and anything else that affects demand, is unchanged). This is what the *ceteris paribus* assumption really means. In this

particular case, after we analyze each factor separately, we can combine the results. The amount consumers buy falls for two reasons: first because of the higher price and second because of the lower income.

Watch It

Watch this video to review the theory of demand. Remember that, according to the law of demand and all other things being equal (*ceteris paribus*):

- the lower the price of a product, the more of it will be bought
- the higher the price of a product, the less of it will be bought

A link to an interactive elements can be found at the bottom of this page.

Learning Objectives

[glossary-page][glossary-term]ceteris paribus: [/glossary-term]
[glossary-definition]when changing one variable in a function (e.g. demand for some product), we assume that everything else held is constant[/glossary-definition][glossary-term]demand: [/glossary-term]
[glossary-definition]the relationship between the price of a certain good or service and the quantity of that good or service someone is willing and able to buy[/glossary-definition][glossary-term]demand curve: [/glossary-term][glossary-definition]a graphic representation of the relationship between price and quantity demanded of a certain good or service, with price on the vertical axis and quantity on the horizontal axis[/glossary-definition][glossary-term]demand schedule: [/glossary-term]
[glossary-definition]a table that shows the quantity demanded for a certain good or service at a range of prices[/glossary-definition][glossary-term]law of demand: [/glossary-term][glossary-definition]the common relationship that a higher price leads to a lower quantity demanded of a certain good or service and a lower price leads to a higher quantity demanded, while all other variables are held constant[/glossary-definition][glossary-term]price: [/glossary-term]
[glossary-definition] what a buyer pays for a unit of the specific good or service[/glossary-definition][glossary-term]quantity demanded: [/glossary-term][glossary-definition]the total number of units of a good or service consumers wish to purchase at a given price[/glossary-definition][/glossary-page]

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3.11: Factors Affecting Demand

Learning Objectives

- Describe which factors cause a shift in the demand curve and explain why the shift occurs
- Define and give examples of substitutes and complements
- Draw a demand curve and graphically represent changes in demand

We know that a change in prices affects the quantity demanded. Price, however, is not the only thing that influences demand. For example, how is demand for vegetarian food affected if, say, health concerns cause more consumers to avoid eating meat?

The Effect of Income on Demand

Let's use income as an example of how factors other than price affect demand. Figure 1 shows the initial demand for automobiles as D_0. At point Q, for example, if the price is $20,000 per car, the quantity of cars demanded is 18 million. D_0 also shows how the quantity of cars demanded would change as a result of a higher or lower price. For example, if the price of a car rose to $22,000, the quantity demanded would decrease to 17 million, at point R.

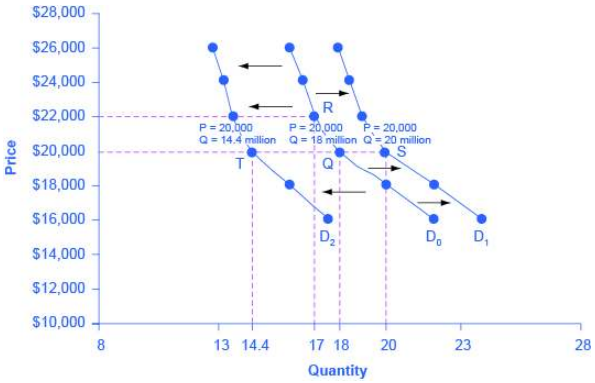


Figure 1. Shifts in Demand: A Car Example.

The original demand curve D_0, like every demand curve, is based on the *ceteris paribus* assumption that no other economically relevant factors change. Now imagine that the economy expands in a way that raises the incomes of many people, making cars more affordable. How will this affect demand? How can we show this graphically?

Return to Figure 1. The price of cars is still $20,000, but with higher incomes, the quantity demanded has now increased to 20 million cars, shown at point S. As a result of the higher income levels, the demand curve shifts to the right to the new demand curve D_1, indicating an increase in demand. Table 1, below, shows clearly that this increased demand would occur at every price, not just the original one.

Table 1. Price and Demand Shifts: A Car Example

Price	Decrease to D_2	Original Quantity Demanded D_0	Increase to D_1
$16,000	17.6 million	22.0 million	24.0 million
$18,000	16.0 million	20.0 million	22.0 million
$20,000	14.4 million	18.0 million	20.0 million
$22,000	13.6 million	17.0 million	19.0 million
$24,000	13.2 million	16.5 million	18.5 million
$26,000	12.8 million	16.0 million	18.0 million

Now, imagine that the economy slows down so that many people lose their jobs or work fewer hours, reducing their incomes. In this case, the decrease in income would lead to a lower quantity of cars demanded at every given price, and the original demand curve D_0 would shift left to D_2. The shift from D_0 to D_2 represents such a decrease in demand: At any given price level, the quantity demanded is now lower. In this example, a price of $20,000 means 18 million cars sold along the original demand curve, but only 14.4 million sold after demand fell.





Figure 2.A New Shopping Trip. When this family got a raise, they shopped at an expensive organic grocery store instead of buying generic groceries. The generic groceries are an example of an inferior good.

When a demand curve shifts, it does not mean that the quantity demanded by every individual buyer changes by the same amount. In this example, not everyone would have higher or lower income and not everyone would buy or not buy an additional car. Instead, a shift in a demand curve captures a pattern for the market as a whole: Increased demand means that at every given price, the quantity demanded is higher, so that the demand curve shifts to the right from D_0 to D_1. And, decreased demand means that at every given price, the quantity demanded is lower, so that the demand curve shifts to the left from D_0 to D_2.

We just argued that higher income causes greater demand at every price. This is true for most goods and services. For some—luxury cars, vacations in Europe, and fine jewelry—the effect of a rise in income can be especially pronounced. A product whose demand rises when income rises, and vice versa, is called a **normal good**. A few exceptions to this pattern do exist, however. As incomes rise, many people will buy fewer generic-brand groceries and more name-brand groceries. They are less likely to buy used cars and more likely to buy new cars. They will be less likely to rent an apartment and more likely to own a home, and so on. A product whose demand falls when income rises, and vice versa, is called an **inferior good**. In other words, when income increases, the demand curve shifts to the left.

Try It

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https://assessments.lumenlearning.co...sessments/7112

Watch It

A change in price does not shift the demand curve. It only shows a difference in the quantity demanded. The demand curve will move left or right when there is an underlying change in demand at all prices.

A link to an interactive elements can be found at the bottom of this page.

Other Factors That Shift Demand Curves

Income is not the only factor that causes a shift in demand. Other things that change demand include tastes and preferences, the composition or size of the population, the prices of related goods, and even expectations. A change in any one of the underlying factors that determine what quantity people are willing to buy at a given price will cause a shift in demand. Graphically, the new demand curve lies either to the right (an increase) or to the left (a decrease) of the original demand curve. Let's look at these factors.

Changing Tastes or Preferences



Figure 3.Changing Tastes. This man eats a chicken foot. Changes in society's preferences for chicken have led to changes in demand for certain foods.

From 1980 to 2012, the per-person consumption of chicken by Americans rose from 33 pounds per year to 81 pounds per year, and consumption of beef fell from 77 pounds per year to 57 pounds per year, according to the U.S. Department of Agriculture (USDA). Changes like these are largely due to shifts in taste, which change the quantity of a good demanded at every price: That is, they shift the demand curve for that good—rightward for chicken and leftward for beef.

Changes in the Composition of the Population

The proportion of elderly citizens in the United States population is rising. It rose from 9.8 percent in 1970 to 12.6 percent in 2000 and will be a projected (by the U.S. Census Bureau) 20 percent of the population by 2030. A society with relatively more children, like the United States in the 1960s, will have greater demand for goods and services like tricycles and day care facilities. A society with relatively more elderly persons, as the United States is projected to have by 2030, has a higher demand for nursing homes and hearing aids. Similarly, changes in the size of the

population can affect the demand for housing and many other goods. Each of these changes in demand will be shown as a shift in the demand curve.

Changes in the Prices of Related Goods

The demand for a product can also be affected by changes in the prices of related goods such as substitutes or complements. A **substitute** is a good or service that can be used in place of another good or service. As electronic books become more available, you would expect to see a decrease in demand for traditional printed books. A lower price for a substitute decreases demand for the other product. For example, in recent years as the price of tablet computers has fallen, the quantity demanded has increased (because of the law of demand). Since people are purchasing tablets, there has been a decrease in demand for laptops, which can be shown graphically as a leftward shift in the demand curve for laptops. A higher price for a substitute good has the reverse effect.



Figure 4. **Office Supplies.** A drop in the price of pens and pencils may lead to higher demand for complement office supplies.

Other goods are **complements** for each other, meaning that the goods are often used together, because consumption of one good tends to enhance consumption of the other. Examples include breakfast cereal and milk; notebooks and pens or pencils, golf balls and golf clubs; gasoline and sport utility vehicles; and the five-way combination of bacon, lettuce, tomato, mayonnaise, and bread. If the price of golf clubs rises, since the quantity of golf clubs demanded falls (because of the law of demand), demand for a complement good like golf balls decreases, too. Similarly, a higher price for skis would shift the demand curve for a complement good like ski resort trips to the left, while a lower price for a complement has the reverse effect.

Changes in Expectations About Future Prices

While it is clear that the price of a good affects the quantity demanded, it is also true that expectations about the future price (or expectations about tastes and preferences, income, and so on) can affect demand. For example, if people hear that a hurricane is coming, they may rush to the store to buy flashlight batteries and bottled water. If people learn that the price of a good like coffee is likely to rise in the future, they may head for the store to stock up on coffee now. These changes in demand are shown as shifts in the curve. Therefore, a shift in demand happens when a change in some economic factor (other than the current price) causes a different quantity to be demanded at every price.

Try It

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Exercise: Shift in Demand Due to Income Increase

A shift in demand means that at any price (and at every price), the quantity demanded will be different than it was before. Following is a graphic illustration of a shift in demand due to an income increase.

Step 1. Draw the graph of a demand curve for a normal good like pizza. Pick a price (like P_0). Identify the corresponding Q_0. An example is shown in Figure 5.

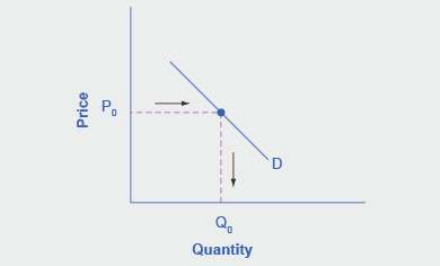


Figure 5. Demand Curve. A demand curve can be used to identify how much consumers would buy at any given price.

Step 2. Suppose income increases. As a result of the change, are consumers going to buy more or less pizza? The answer is more. Draw a dotted horizontal line from the chosen price, through the original quantity demanded, to the new point with the new Q_1. Draw a dotted vertical line down to the horizontal axis and label the new Q_1. An example is provided in Figure 6.

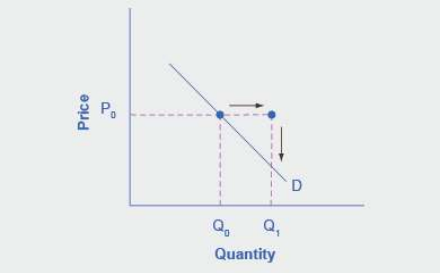


Figure 6. Demand Curve with Income Increase. With an increase in income, consumers will purchase larger quantities, pushing demand to the right.

Step 3. Now, shift the curve through the new point. You will see that an increase in income causes an upward (or rightward) shift in the demand curve, so that at any price, the quantities demanded will be higher, as shown in Figure 7.

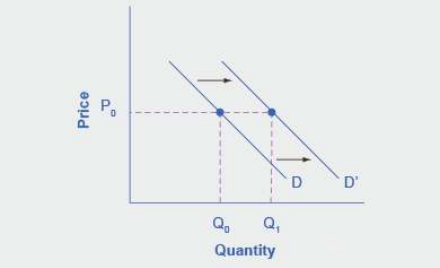


Figure 7. Demand Curve Shifted Right. With an increase in income, consumers will purchase larger quantities, pushing demand to the right, and causing the demand curve to shift right.

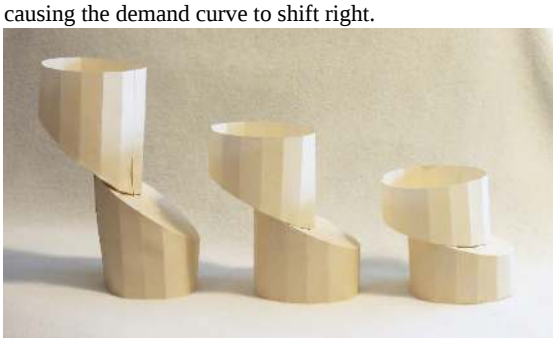


Figure 8. Remember that changes in price change the point of quantity demanded on the demand curve, but changes in other factors (such as taste, population, income, expectations, and prices of other goods) will cause the entire demand curve to shift.

Summary: What Factors Shift Demand?

Six factors that can shift demand curves are summarized in Figure 9, below. The direction of the arrows indicates whether the demand curve shifts represent an increase in demand or a decrease in demand. Notice that a change in the price of the good or service itself is not listed among the factors that can shift a demand curve. A change in the price of a good or service causes a movement along a specific demand curve, and it typically leads to some change in the quantity demanded, but it does not shift the demand curve.

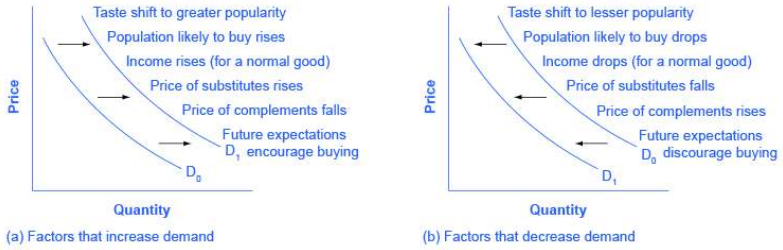


Figure 9. Factors That Shift Demand Curves (a) A list of factors that can cause an increase in demand from D_0 to D_1. (b) The same factors, if their direction is reversed, can cause a decrease in demand from D_0 to D_1.

Try It

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Learning Objectives

[glossary-page][glossary-term]complements: [/glossary-term]
[glossary-definition]goods or services that are used together because the use of one enhances the use of the other[/glossary-definition]
[glossary-term]substitutes: [/glossary-term][glossary-definition]goods or services that can be used in place of one another[/glossary-definition][glossary-term]inferior good: [/glossary-term][glossary-definition]good or service whose demand decreases when a consumer's income increases and demand increases when income decreases[/glossary-definition][glossary-term]normal good: [/glossary-term]
[glossary-definition]good or service whose demand increases when a consumer's income increases and demand decreases when income decreases[/glossary-definition]

[/glossary-page]

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3.12: Learn By Doing- Graphing Demand

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Note that you will use the information provided in the first question for all of the questions on this page.

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3.13: Learn By Doing- Demand for Food Trucks

Try It

Play the simulation below to examine how the demand for drinks changes when the price or the weather change. The simulation allow unlimited attempts so that you can gain experience applying the concepts.

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3.14: Introduction to Supply

What you'll learn to do: explain the determinants of supply



So far you've learned about the role of demand in economics—which is the consumer side of the story. In this section, you'll learn about the producer side of economics to see what factors impact the amount of goods supplied in a market. For example, suppose the global price of petroleum falls significantly. What do you think will happen to the supply of gasoline? How are supply and price connected? In this section you'll examine the law of supply and see why this counterpart to "demand" is also essential to understanding economics.

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3.15: What is Supply?

Learning Objectives

- Explain supply and the law of supply
- Identify and explain a supply curve
- Create and interpret a supply curve using a data set



Figure 1. When oil prices are high, suppliers want to sell more. The law of supply says that a higher price leads to higher quantity supplied.

Supply of Goods and Services

When economists talk about **supply**, they mean the amount of some good or service a producer is willing to supply at each price. Price is what the producer receives for selling one unit of a good or service. A rise in price almost always leads to an increase in the quantity supplied of that good or service, while a fall in price will decrease the quantity supplied. When the price of gasoline rises, for example, it encourages profit-seeking firms to take several actions: expand exploration for oil reserves; drill for more oil; invest in more pipelines and oil tankers to bring the oil to plants where it can be refined into gasoline; build new oil refineries; purchase additional pipelines and trucks to ship the gasoline to gas stations; and open more gas stations or keep existing gas stations open longer hours. Economists call this positive relationship between price and quantity supplied—that a higher price leads to a higher quantity supplied and a lower price leads to a lower quantity supplied—the **law of supply**. The law of supply, like the law of demand, assumes that all other variables that affect supply are held equal (*ceteris paribus*).

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https://assessments.lumenlearning.co...sessments/7118

Watch It

The supply curve shows how much that sellers will be willing to provide at different prices. Because suppliers want to make a profit, companies have an incentive to sell more oil if it sells at a higher price.

A link to an interactive elements can be found at the bottom of this page.

Is Supply the same as Quantity Supplied?

In economic terminology, supply is not the same as quantity supplied. When economists refer to supply, they mean the relationship between a range of prices and the quantities supplied at those prices, a relationship that can be illustrated with a supply curve or a supply schedule. When economists refer to **quantity supplied**, they mean only a certain point on the supply curve, or one quantity on the supply schedule. In short, supply refers to the curve, and quantity supplied refers to the (specific) point on the curve.

Like demand, supply can be illustrated using a table or a graph. A **supply schedule** is a table—like Table 1, below—that shows the quantity supplied at a range of different prices. Again, price is measured in dollars per gallon of gasoline, and quantity supplied is measured in millions of gallons.

Table 1. Price and Supply of Gasoline	
Price (per gallon)	Quantity Supplied (millions of gallons)
$1.00	500
$1.20	550
$1.40	600
$1.60	640
$1.80	680
$2.00	700
$2.20	720

A **supply curve** is a graphic illustration of the relationship between price, shown on the vertical axis, and quantity, shown on the horizontal axis. Figure 1 illustrates the law of supply, again using the market for gasoline as an example. You can see from this curve that as the price rises, quantity supplied also increases and vice versa. The supply schedule and the supply curve are just two different ways of showing the same information. Note that each point on the supply curve comes from one row in Table 1. For example, the lowermost point on the supply curve corresponds to the first row in Table 1, while the upper most point corresponds to the last row. Notice also that the horizontal and vertical axes on the graph for the supply curve are the same as for the demand curve.

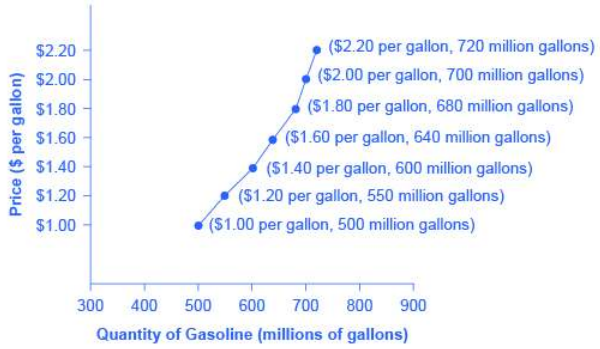


Figure 2. A Supply Curve for Gasoline.

The shape of supply curves will vary somewhat according to the product: steeper, flatter, straighter, or curved. Nearly all supply curves, however, share a basic similarity: They slope up from left to right and illustrate the law of supply. As the price rises, say, from $1.00 per gallon to $2.20 per gallon, the quantity supplied increases from 500 gallons to 720 gallons. Conversely, as the price falls, the quantity supplied decreases.

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https://assessments.lumenlearning.co...sessments/7120

Watch It

To review the concepts of supply, watch this summary video from Dr. McGlasson:

A link to an interactive elements can be found at the bottom of this page.

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https://assessments.lumenlearning.co...sessments/7122

Learning Objectives

[glossary-page][glossary-term]law of supply: [/glossary-term]
[glossary-definition]the common relationship that a higher price leads to a higher quantity supplied of a certain good or service and a lower price leads to a higher quantity supplied, while all other variables are held constant[/glossary-definition][glossary-term]quantity supplied: [/glossary-term][glossary-definition]the total number of units of a good or service producers are willing to supply at a given price[/glossary-definition][glossary-term]supply: [/glossary-term][glossary-definition]the relationship between the price of a certain good or service and the quantity of that good or service producers are willing to offer for sale [/glossary-definition][glossary-term]supply curve: [/glossary-term][glossary-definition]a graphic representation of the relationship between price and quantity supplied of a certain good or service, with price on the vertical axis and quantity on the horizontal axis [/glossary-definition][glossary-term]supply schedule: [/glossary-term][glossary-definition]a table that shows the quantity demanded for a certain good or service at a range of prices[/glossary-definition][/glossary-page]

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3.16: Factors Affecting Supply

Learning Objectives

- Describe which factors cause a shift in the supply curve and show them on a graph

How Production Costs Affect Supply

A supply curve shows how quantity supplied will change as the price rises and falls, assuming *ceteris paribus*, that is, no other economically relevant factors are changing. If other factors relevant to supply do change, then the entire supply curve will shift. Just as a shift in demand is represented by a change in the quantity demanded at every price, a *shift in supply* means a change in the quantity supplied at every price.

In thinking about the factors that affect supply, remember what motivates firms: profits, which are the difference between revenues and costs. Goods and services are produced using combinations of labor, materials, and machinery, or what we call inputs (also called factors of production). If a firm faces lower costs of production, while the prices for the good or service the firm produces remain unchanged, a firm's profits go up. When a firm's profits increase, it's more motivated to produce output (goods or services), since the more it produces the more profit it will earn. So, when costs of production fall, a firm will tend to supply a larger quantity at any given price for its output. This can be shown by the supply curve shifting to the right.



Figure 1. Shipping Cars. If production costs increase, the supply for cars and trucks will shift to the left.

Take, for example, a messenger company that delivers packages around a city. The company may find that buying gasoline is one of its main costs. If the price of gasoline falls, then the company will find it can deliver packages more cheaply than before. Since lower costs correspond to higher profits, the messenger company may now supply more of its services at any given price. For example, given the lower gasoline prices, the company can now serve a greater area, and increase its supply.

Conversely, if a firm faces higher costs of production, then it will earn lower profits at any given selling price for its products. As a result, a higher cost of production typically causes a firm to supply a smaller quantity at any given price. In this case, the supply curve shifts to the left.

Consider the supply for cars, shown by curve S_0 in Figure 2, below. Point J indicates that if the price is $20,000, the quantity supplied will be 18 million cars. If the price rises to $22,000 per car, *ceteris paribus*, the quantity supplied will rise to 20 million cars, as point K on the S_0 curve shows. The same information can be shown in table form, as in Table 1.

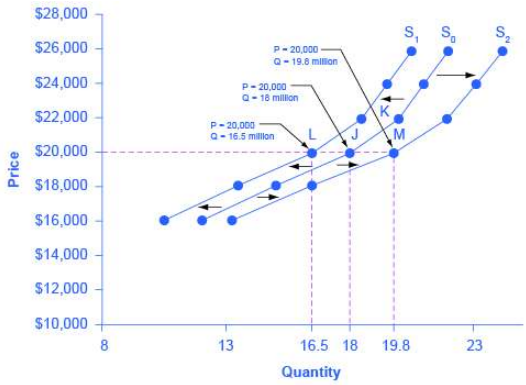


Figure 2. Shifts in Supply: A Car Example.

Table 1. Price and Shifts in Supply: A Car Example			
Price	**Decrease to S_1**	**Original Quantity Supplied S_0**	**Increase to S_2**
$16,000	10.5 million	12.0 million	13.2 million
$18,000	13.5 million	15.0 million	16.5 million
$20,000	16.5 million	18.0 million	19.8 million
$22,000	18.5 million	20.0 million	22.0 million
$24,000	19.5 million	21.0 million	23.1 million

Now imagine that the price of steel—an important component in vehicle manufacturing—rises, so that producing a car has become more expensive. At any given price for selling cars, car manufacturers will react by supplying a lower quantity. This can be shown graphically as a leftward shift of supply, from S_0 to S_1, which indicates that at any given price, the quantity supplied decreases. In this example, at a price of $20,000, the quantity supplied decreases from 18 million on the original supply curve (S_0) to 16.5 million on the supply curve S_1, which is labeled as point L.

Conversely, if the price of steel decreases, producing a car becomes less expensive. At any given price for selling cars, car manufacturers can now expect to earn higher profits, so they will supply a higher quantity. The shift of supply to the right, from S_0 to S_2, means that at all prices, the quantity supplied has increased. In this example, at a price of $20,000, the quantity supplied increases from 18 million on the original supply curve (S_0) to 19.8 million on the supply curve S_2, which is labeled M.

Shift in Supply Due to Production-Cost Increase

We know that a supply curve shows the minimum price a firm will accept to produce a given quantity of output. What happens to the supply curve when the cost of production goes up? Following is an example of a shift in supply due to an increase in production cost.



Figure 3. Delivery Options. Since this is not a realistic option for pizza suppliers, what happens to the supply curve when production costs increase?

Exercise: Shift in Supply

Step 1. Draw a graph of a supply curve for pizza. Pick a quantity (like Q_0). If you draw a vertical line up from Q_0 to the supply curve, you will see the price the firm chooses. An example is shown in Figure 4.

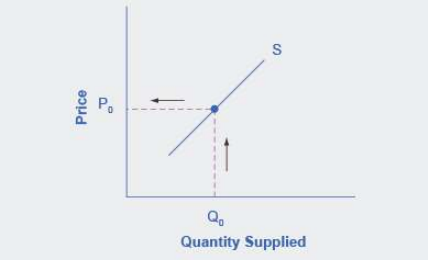


Figure 4.Supply Curve. The supply curve can be used to show the minimum price a firm will accept to produce a given quantity of output.

Step 2. Why did the firm choose that price and not some other? One way to think about this is that the price is composed of two parts. The first part is the average cost of production: in this case, the cost of the pizza ingredients (dough, sauce, cheese, pepperoni, and so on), the cost of the pizza oven, the rent on the shop, and the wages of the workers. The second part is the firm's desired profit, which is determined, among other

factors, by the profit margins in that particular business. If you add these two parts together, you get the price the firm wishes to charge. The quantity Q_0 and associated price P_0 give you one point on the firm's supply curve, as shown in Figure 5.

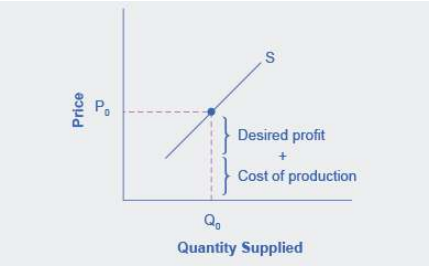


Figure 5.Setting Prices. The cost of production and the desired profit equal the price a firm will set for a product.

Step 3. Now, suppose that the cost of production goes up. Perhaps cheese has become more expensive by $0.75 per pizza. If that is true, the firm will want to raise its price by the amount of the increase in cost ($0.75). Draw this point on the supply curve directly above the initial point on the curve, but $0.75 higher, as shown in Figure 6.

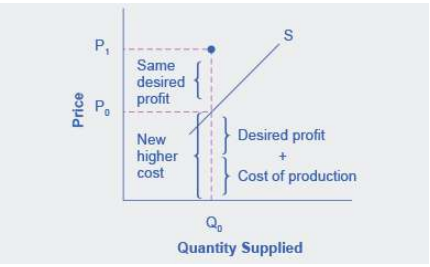


Figure 6. Increasing Costs Lead to Increasing Price. Because the cost of production plus the desired profit equal the price a firm will set for a product, if the cost of production increases, the price for the product will also need to increase.

Step 4. Shift the supply curve through this point. You will see that an increase in cost causes a leftward shift of the supply curve so that at any price, the quantities supplied will be smaller, as shown in Figure 7.

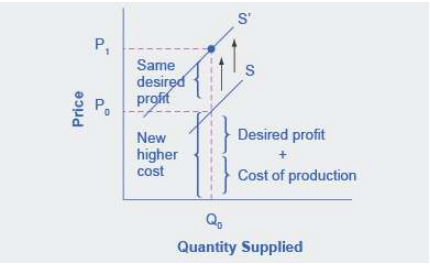


Figure 7. Supply Curve Shifted Left. When the cost of production increases, the supply curve shifts leftward to a new price level.

Other Factors That Affect Supply

In the example above, we saw that changes in the prices of inputs in the production process will affect the cost of production and thus the supply. Several other things affect the cost of production, too, such as changes in weather or other natural conditions, new technologies for production, and some government policies.



Figure 8. Field of Wheat. Especially good growing seasons and weather could lead to greater supply and a rightward shift in the supply curve.

The cost of production for many agricultural products will be affected by changes in natural conditions. For example, the area of northern China that typically grows about 60 percent of the country's wheat output experienced its worst drought in at least fifty years in the second half of 2009. A drought decreases the supply of agricultural products, which means that at any given price, a lower quantity will be supplied; conversely, especially good weather would shift the supply curve to the right.

When a firm discovers a new technology that allows it to produce at a lower cost, the supply curve will shift to the right, as well. For instance, in the 1960s a major scientific effort nicknamed the Green Revolution focused on breeding improved seeds for basic crops like wheat and rice. By the early 1990s, more than two-thirds of the wheat and rice in low-income countries around the world was grown with these Green Revolution seeds—and the harvest was twice as high per acre. A technological improvement that reduces costs of production will shift supply to the right, so that a greater quantity will be produced at any given price.

Government policies can affect the cost of production and the supply curve through taxes, regulations, and subsidies. For example, the U.S. government imposes a tax on alcoholic beverages that collects about $8 billion per year from producers. Taxes are treated as costs by businesses. Higher costs decrease supply for the reasons discussed above. Other examples of policy that can affect cost are the wide array of government regulations that require firms to spend money to provide a cleaner environment or a safer workplace; complying with regulations increases the cost of producing any level of output.

A government subsidy, on the other hand, is the opposite of a tax. A **subsidy** occurs when the government pays a firm directly or reduces the firm's taxes if the firm carries out certain actions. From the firm's perspective, subsidies are an offset to costs; they essentially reduce the cost of production and increase supply at every given price, shifting supply to the right.

Summary: What Factors Shift Supply?

Changes in the cost of inputs, natural disasters, new technologies, taxes, subsidies, and government regulation all affect the cost of production. In turn, these factors affect how much firms are willing to supply at any given price.

Figure 9 below summarizes factors that change the supply of goods and services. Notice that a change in the price of the product itself is not among the factors that shift the supply curve. Although a change in price of a good or service typically causes a change in quantity supplied or a movement along the supply curve for that specific good or service, it does not cause the supply curve itself to shift.

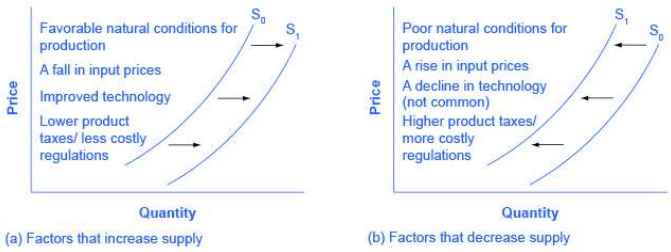


Figure 9.Factors That Shift Supply Curves. (a) A list of factors that can cause an increase in supply from S0 to S1. (b) The same factors, if their direction is reversed, can cause a decrease in supply from S0 to S1.

Because demand and supply curves appear on a two-dimensional diagram with only price and quantity on the axes, an unwary visitor to the land of economics might be fooled into believing that economics is about only four topics: demand, supply, price, and quantity. However, demand and supply are really "umbrella" concepts: demand covers all the factors that affect demand, and supply covers all the factors that affect supply. Factors other than price that affect demand and supply are included by using shifts in the demand or the supply curve. In this way, the two-dimensional demand and supply model becomes a powerful tool for analyzing a wide range of economic circumstances.

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Learning Objectives

[glossary-page][glossary-term]subsidy: [/glossary-term]
[glossary-definition]a government payment to firms to encourage production of some good or service[/glossary-definition]
[/glossary-page]

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3.17: Learn By Doing- Graphing Supply and Demand

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3.18: Learn By Doing- Supply of Food Trucks

Try It

In this simulation, you will get to adjust how many food trucks are needed to feed some players and fans attending a soccer match. Click through the various options to see how different choices lead to different outcomes in the cost and amount of food supplied.

A link to an interactive elements can be found at the bottom of this page.

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3.19: Introduction to Equilibrium

What you'll learn to do: explain and graphically illustrate market equilibrium, surplus, and shortage



In this section, you'll learn how supply and demand interact to determine the ideal price and quantity of a good in a market. When a good is not sold at its ideal price, a shortage or a surplus may be the result.

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3.20: Equilibrium, Surplus, and Shortage

Learning Objectives

- Define equilibrium price and quantity and identify them in a market
- Define surpluses and shortages and explain how they cause the price to move towards equilibrium

Demand and Supply

In order to understand market equilibrium, we need to start with the laws of demand and supply. Recall that the law of demand says that as price decreases, consumers demand a higher quantity. Similarly, the law of supply says that when price decreases, producers supply a lower quantity.

Because the graphs for demand and supply curves both have price on the vertical axis and quantity on the horizontal axis, the demand curve and supply curve for a particular good or service can appear on the same graph. Together, demand and supply determine the price and the quantity that will be bought and sold in a market. These relationships are shown as the demand and supply curves in Figure 1, which is based on the data in Table 1, below.

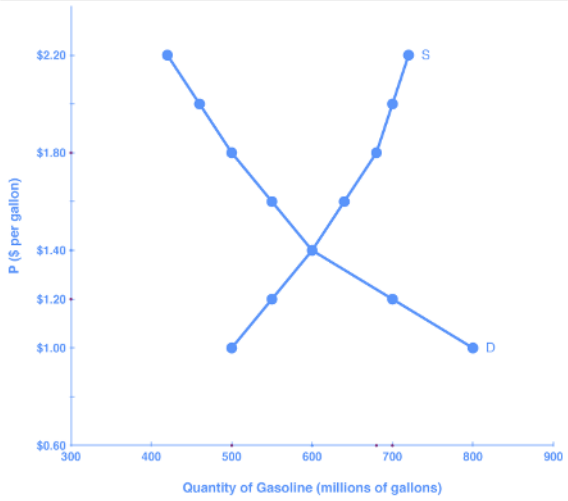


Figure 1. The supply and demand curves for gasoline.

Table 1. Price, Quantity Demanded, and Quantity Supplied

Price (per gallon)	Quantity demanded (millions of gallons)	Quantity supplied (millions of gallons)
$1.00	800	500
$1.20	700	550
$1.40	**600**	**600**
$1.60	550	640
$1.80	500	680
$2.00	460	700
$2.20	420	720

If you look at either Figure 1 or Table 1, you'll see that at most prices the amount that consumers want to buy (which we call the quantity demanded) is different from the amount that producers want to sell (which we call the quantity supplied). What does it

mean when the quantity demanded and the quantity supplied aren't the same? The answer is: a surplus or a shortage.

Surplus or Excess Supply

Let's consider one scenario in which the amount that producers want to sell doesn't match the amount that consumers want to buy. Consider our gasoline market example. Imagine that the price of a gallon of gasoline were $1.80 per gallon. This price is illustrated by the dashed horizontal line at the price of $1.80 per gallon in Figure 2, below.

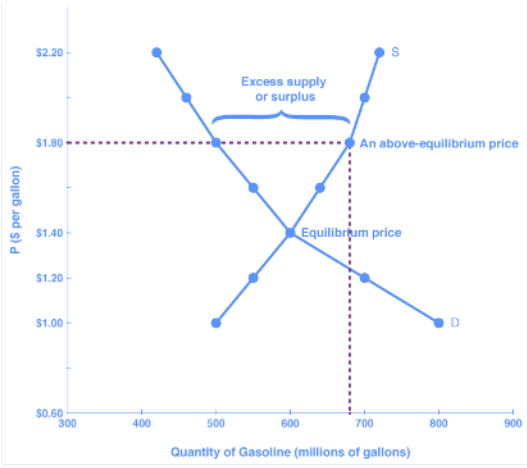


Figure 2. A price above equilibrium creates a surplus.

At this price, the quantity demanded is 500 gallons, and the quantity of gasoline supplied is 680 gallons. You can also find these numbers in Table 1, above. Now, compare the quantity demanded and quantity supplied at this price. Quantity supplied (680) is greater than quantity demanded (500). Or, to put it in words, the amount that producers want to sell is greater than the amount that consumers want to buy. We call this a situation of **excess supply** (since Qs > Qd) or a **surplus**. Note that whenever we compare supply and demand, it's in the context of a specific price—in this case, $1.80 per gallon.

With a surplus, gasoline accumulates at gas stations, in tanker trucks, in pipelines, and at oil refineries. This accumulation puts pressure on gasoline sellers. If a surplus remains unsold, those firms involved in making and selling gasoline are not receiving enough cash to pay their workers and cover their expenses. In this situation, some firms will want to cut prices, because it is better to sell at a lower price than not to sell at all. Once some sellers start cutting prices; others will follow to avoid losing sales. These price reductions will, in turn, stimulate a higher quantity demanded.

How far will the price fall? Whenever there is a surplus, the price will drop until the surplus goes away. When the surplus is eliminated, the quantity supplied just equals the quantity demanded—that is, the amount that producers want to sell exactly equals the amount that consumers want to buy. We call this **equilibrium**, which means "balance." In this case, the equilibrium occurs at a price of $1.40 per gallon and at a quantity of 600 gallons. You can see this in Figure 2 (and Figure 1) where the supply and demand curves cross. You can also find it in Table 1 (the numbers in bold).

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Shortage or Excess Demand

Let's return to our gasoline problem. Suppose that the price is $1.20 per gallon, as the dashed horizontal line at this price in Figure 3, below, shows. At this price, the quantity demanded is 700 gallons, and the quantity supplied is 550 gallons.

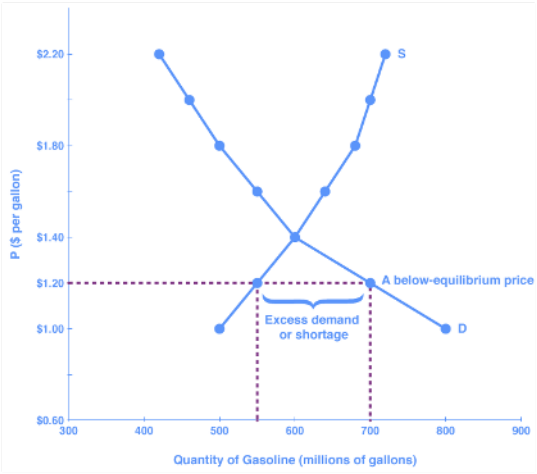


Figure 3. A price below equilibrium creates a shortage.

Quantity supplied (550) is less than quantity demanded (700). Or, to put it in words, the amount that producers want to sell is less than the amount that consumers want to buy. We call this a situation of **excess demand** (since Qd > Qs) or a **shortage**.

In this situation, eager gasoline buyers mob the gas stations, only to find many stations running short of fuel. Oil companies and gas stations recognize that they have an opportunity to make higher profits by selling what gasoline they have at a higher price. These price increases will stimulate the quantity supplied and reduce the quantity demanded. As this occurs, the shortage will decrease. How far will the price rise? The price will rise until the shortage is eliminated and the quantity supplied equals quantity demanded. In other words, the market will be in equilibrium again. As before, the equilibrium occurs at a price of $1.40 per gallon and at a quantity of 600 gallons.

Generally any time the price for a good is *below* the equilibrium level, incentives built into the structure of demand and supply will create pressures for the price to rise. Similarly, any time the price for a good is *above* the equilibrium level, similar pressures will generally cause the price to fall.

As you can see, the quantity supplied or quantity demanded in a free market will correct over time to restore balance, or equilibrium.



Figure 4. Equilibrium is the point where the amount that buyers want to buy matches the point where sellers want to sell.

Equilibrium: Where Supply and Demand Intersect

When two lines on a diagram cross, this intersection usually means something. On a graph, the point where the supply curve (S) and the demand curve (D) intersect is the **equilibrium**. The **equilibrium price** is the only price where the desires of consumers and the desires of producers agree—that is, where the amount of the product that consumers want to buy (quantity demanded) is equal to the amount producers want to sell (quantity supplied). This mutually desired amount is called the **equilibrium quantity**. At any other price, the quantity demanded does not equal the quantity supplied, so the market is not in equilibrium at that price. It should

be clear from the previous discussions of surpluses and shortages, that if a market is not in equilibrium, market forces will push the market to the equilibrium.

If you have only the demand and supply schedules, and no graph, you can find the equilibrium by looking for the price level on the tables where the quantity demanded and the quantity supplied are equal (again, the numbers in **bold** in Table 1 indicate this point).

Finding Equilibrium with Algebra

We've just explained two ways of finding a market equilibrium: by looking at a table showing the quantity demanded and supplied at different prices, and by looking at a graph of demand and supply. We can also identify the equilibrium with a little algebra if we have equations for the supply and demand curves. Let's practice solving a few equations that you will see later in the course. Right now, we are only going to focus on the math. Later you'll learn why these models work the way they do, but let's start by focusing on solving the equations. Suppose that the demand for soda is given by the following equation:

$$Qd=16-2P$$

where Qd is the amount of soda that consumers want to buy (i.e., quantity demanded), and *P* is the price of soda. Suppose the supply of soda is

$$Qs=2+5P$$

where Qs is the amount of soda that producers will supply (i.e., quantity supplied). (Remember, these are simple equations for lines). Finally, recall that the soda market converges to the point where supply equals demand, or

$$Qd=Qs$$

We now have a system of three equations and three unknowns (Qd, Qs, and P), which we can solve with algebra. Since

$$Qd=Qs,$$

we can set the demand and supply equations equal to each other:

$$\begin{array}{c}Qd=Qs\\16-2P=2+5P\end{array}$$

Step 1: Isolate the variable by adding 2P to both sides of the equation, and subtracting 2 from both sides.

$$\begin{array}{l}16-2P=2+5P\\-2+2P=-2+2P\\14=7P\end{array}$$

Step 2: Simplify the equation by dividing both sides by 7.

$$\begin{array}{l}\underline{14}=\underline{7P}\\7\quad\quad 7\\2=P\end{array}$$

The equilibrium price of soda, that is, the price where Qs = Qd will be $2. Now we want to determine the quantity amount of soda. We can do this by plugging the equilibrium price into *either* the equation showing the demand for soda *or* the equation showing the supply of soda. Let's use demand. Remember, the formula for quantity demanded is the following:

$$Qd=16-2P$$

Taking the price of $2, and plugging it into the demand equation, we get

$$\begin{array}{l}Qd=16-2(2)\\Qd=16-4\\Qd=12\end{array}$$

So, if the price is $2 each, *consumers* will purchase 12. How much will producers supply, or what is the quantity supplied? Taking the price of $2, and plugging it into the equation for quantity supplied, we get the following:

$$\begin{array}{l}Qs=2+5P\\Qs=2+5(2)\\Qs=2+10\\Qs=12\end{array}$$

Now, if the price is $2 each, *producers* will supply 12 sodas. This means that we did our math correctly, since

$$Qd=Qs$$

and both Qd and Qs are equal to 12. That confirms that we've found the equilibrium quantity.

Watch It

Watch this video for a closer look at market equilibrium:

A link to an interactive elements can be found at the bottom of this page.

Equilibrium and Economic Efficiency

Equilibrium is important to create both a balanced market and an efficient market. If a market is at its equilibrium price and quantity, then it has no reason to move away from that point, because it's balancing the quantity supplied and the quantity demanded. However, if a market is not at equilibrium, then economic pressures arise to move the market toward the equilibrium price and equilibrium quantity. This happens either because there is more supply than what the market is demanding or because there is more demand than the market is supplying. This balance is a natural function of a free-market economy.

Also, a competitive market that is operating at equilibrium is an efficient market. Economists typically define **efficiency** in this way: when it is impossible to improve the situation of one party without imposing a cost on another. Conversely, if a situation is inefficient, it becomes possible to benefit at least one party without imposing costs on others.



Figure 5. Demand and Supply for Gasoline: Equilibrium. At this equilibrium point, the market is efficient because the optimal amount of gasoline is being produced and consumed.

Efficiency in the demand and supply model has the same basic meaning: the economy is getting as much benefit as possible from its scarce resources, and all the possible gains from trade have been achieved. In other words, the optimal amount of each good and service is being produced and consumed. We will explore this important concept in detail in the next module on applications of supply and demand.

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Learning Objectives

[glossary-page][glossary-term]efficiency: [/glossary-term]
[glossary-definition]when the optimal amount of goods are produced and consumed, minimizing waste[/glossary-definition]
[glossary-term]equilibrium:[/glossary-term][glossary-definition] price and quantity combination where supply equals demand[/glossary-definition][glossary-term]equilibrium price: [/glossary-term][glossary-definition]the (only) price where the quantity supplied in a market equals the quantity demanded[/glossary-definition][glossary-term]equilibrium quantity: [/glossary-term][glossary-definition]the quantity both supplied and demanded at the equilibrium price[/glossary-

definition][glossary-term]shortage (or excess demand): [/glossary-term][glossary-definition]situation where the quantity demanded in a market is greater than the quantity supplied; occurs at prices below the equilibrium[/glossary-definition][glossary-term]surplus (or excess supply): [/glossary-term][glossary-definition]situation where the quantity demanded in a market is less than the quantity supplied; occurs at prices above the equilibrium[/glossary-definition][/glossary-page]

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3.21: Changes in Equilibrium

Learning Objectives

- Create a graph that illustrates equilibrium price and quantity
- Predict how economic conditions cause a change in supply, demand, and equilibrium (using the four-step process)

Finding Equilibrium using the Four-Step Process

We know that equilibrium is the place where the supply and demand curves intersect, or the point where buyers want to buy the same amount that sellers want to sell. Let's take a closer look at how to find the equilibrium point using the four-step process. These steps explain how to first, draw the demand a supply curves on a graph and find the equilibrium. Next, consider how an economic change (e.g. a natural disaster, a change in production technology, a change in tastes and preferences, income, etc.) might affect supply or demand, then make adjustments to the graph to identify the new equilibrium point.

Step 1. Draw demand and supply curves showing the market before the economic change took place. Think about the shift variables for demand, and the shift variables for supply. Using this diagram, find the initial equilibrium values for price and quantity.

Step 2. Decide whether the economic change being analyzed affects demand or supply. In other words, does the event refer to something in the list of demand shift variables or supply shift variables?

Step 3. Determine whether the effect on demand or supply causes the curve to shift to the right or to the left, and sketch the new demand or supply curve on the diagram. In other words, does the event increase or decrease the amount consumers want to buy or the amount producers want to sell?

Step 4. Identify the new equilibrium, and then compare the original equilibrium price and quantity to the new equilibrium price and quantity.

Let's consider one example that involves a shift in supply and one that involves a shift in demand. Then we will consider an example where both supply and demand shift.

Exercise 1: Good Weather for Salmon Fishing

Let's suppose that during the summer of 2015, weather conditions were excellent for commercial salmon fishing off the California coast. Heavy rains meant higher than normal levels of water in the rivers, which helps the salmon to breed. Slightly cooler ocean temperatures stimulated the growth of plankton, the microscopic organisms at the bottom of the ocean food chain, providing everything in the ocean with a hearty food supply. The ocean stayed calm during fishing season, so commercial fishing operations did not lose many days to bad weather. How did these climate conditions affect the quantity and price of salmon?

Let's consider this situation using the four-step process and the data below.

Table 1. Salmon Fishing

Price per Pound	Quantity Supplied in 2014	Quantity Supplied in 2015	Quantity Demanded
$2.00	80	400	840
$2.25	120	480	680
$2.50	160	550	550
$2.75	200	600	450
$3.00	230	640	350
$3.25	250	670	250
$3.50	270	700	200

Let's walk through the four steps together using this example, and see how the graph changes. Use the interactive graph below (Figure 1) by clicking on the arrows at the bottom of the activity to navigate through the steps.

A link to an interactive elements can be found at the bottom of this page.

Figure 1 (Interactive Graph). Good Weather for Salmon Fishing: The Four-Step Process.

In short, good weather conditions increased supply of the California commercial salmon. The result was a higher equilibrium quantity of salmon bought and sold in the market at a lower price.

Exercise 2: Newspapers and the Internet

According to the Pew Research Center for People and the Press, more and more people, especially younger people, are getting their news from online and digital sources. The majority of U.S. adults now own smartphones or tablets, and most of those Americans say they use them in part to get the news. From 2004 to 2012, the share of Americans who reported getting their news from digital sources increased from 24 percent to 39 percent. How has this trend affected consumption of print news media and radio and television news? Figure 2 and the text below illustrate the four-step analysis used to answer this question.

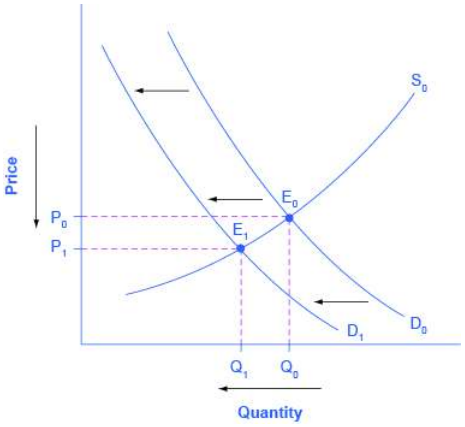


Figure 2. Graph depicting the changing market for print news.

Step 1. Draw a demand and supply model to think about what the market looked like before the event.

The demand curve D_0 and the supply curve S_0 show the original relationships. In this case, the curves are drawn without specific numbers on the price and quantity axis.

Step 2. Did the change described affect supply or demand?

[reveal-answer q="225238"]Show Answer[/reveal-answer]
[hidden-answer a="225238"]A change in tastes, from traditional news sources (print, radio, and television) to digital sources, caused a change in *demand* for the former.[/hidden-answer]

Step 3. Was the effect on demand positive or negative?

[reveal-answer q="58864"]Show Answer[/reveal-answer]
[hidden-answer a="58864"]A shift to digital news sources will tend to mean a lower quantity demanded of traditional news sources at every given price, causing the demand curve for print and other traditional news sources to shift to the left, from D_0 to D_1. [/hidden-answer]

Step 4. Compare the new equilibrium price and quantity to the original equilibrium price.

[reveal-answer q="5745"]Show Answer[/reveal-answer]
[hidden-answer a="5745"]The new equilibrium (E_1) occurs at a lower quantity and a lower price than the original equilibrium (E_0). [/hidden-answer]

The decline in print news reading predates 2004. Print newspaper circulation peaked in 1973 and has declined since then due to competition from television and radio news. In 1991, 55 percent of Americans indicated that they got their news from print sources, while only 29 percent did so in 2012. Radio news has followed a similar path in recent decades, with the share of Americans getting their news from radio declining from 54 percent in 1991 to 33 percent in 2012. Television news has held its own during the

last fifteen years, with the market share staying in the mid to upper fifties. What does this suggest for the future, given that two-thirds of Americans under thirty years old say they don't get their news from television at all?

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3.22: Finding Equilibrium

Learning Objectives

- Explain what happens to supply, demand, and equilibrium when there is a change in both supply and demand

You have seen how changes in weather can influence supply and changes in consumer preferences can reduce demand, but what happens when both supply and demand are changing? Often changes in an economy affect both the supply and the demand curves, making it more difficult to assess the impact on the equilibrium price. Let's review one such example.



Figure 1.Money and Mail. How do changes at the post office impact other aspects of the economy?

First, consider the following questions:

1. Suppose postal workers are successful in obtaining a pay raise from the U.S. Postal Service. Will this affect the supply or the demand for first-class mail? Why? Which determinant of demand or supply is being affected? Show graphically with before and after curves on the same axes. How will this change the equilibrium price and quantity of first-class mail?
2. How do you imagine the invention of email and text messaging affected the market for first-class mail? Why? Which determinant of demand or supply is being affected? Show graphically with before and after curves on the same axes. How will this change the equilibrium price and quantity of first-class mail?
3. Suppose that postal workers get a pay raise *and* email and text messaging become common. What will the combined impact be on the equilibrium price and quantity of first-class mail?

In order to complete a complex analysis like this it's helpful to tackle the parts separately and then combine them, while thinking about possible interactions between the two parts that might affect the overall outcome. Let's use the four-step process.

Exercise: Postal Service

Part 1: A Pay Raise for Postal Workers

Step 1. Draw a demand and supply model to illustrate what the market for the U.S. Postal Service looks like before this scenario starts. The demand curve D and the supply curve S show the original relationships.

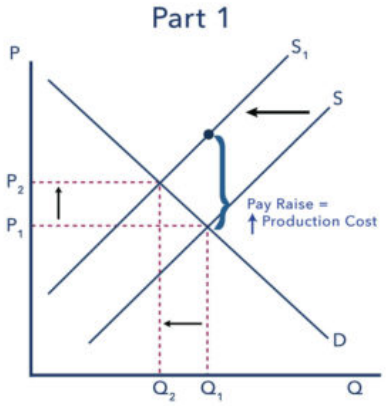


Figure 2. The supply and demand curves for the U.S. Postal Service after a pay raise for postal workers.

Step 2. Will a pay raise for postal workers affect supply or demand?

[reveal-answer q="337241"]Show Answer[/reveal-answer]
[hidden-answer a="337241"]Labor compensation is a cost of production. A change in production costs cause a change in *supply* for the Postal Service.[/hidden-answer]

Step 3. Is the effect on supply positive or negative?

[reveal-answer q="654161"]Show Answer[/reveal-answer]
[hidden-answer a="654161"]Higher labor compensation leads to a lower quantity supplied of postal services at every given price, causing the supply curve for postal services to shift to the left, from S to S_1.[/hidden-answer]

Step 4. Compare the new equilibrium price and quantity to the original equilibrium price.

[reveal-answer q="20641"]Show Answer[/reveal-answer]
[hidden-answer a="20641"]The new equilibrium occurs at a lower quantity and a higher price than the original equilibrium. [/hidden-answer]

A pay raise for postal workers would represent an increase in the cost of production for the Postal Service. Production costs are a factor that influences supply; thus, the pay raise should decrease the supply of first-class mail, shifting the supply curve vertically by the amount of the pay raise. Intuitively, all else held constant, the Postal Service would like to charge a higher price that incorporates the higher cost of production. That is not to say the higher price will stick. From the graph (Figure 1), it should be clear that at that higher price, the quantity supplied is greater than the quantity demanded—thus there would be a surplus, indicating that the price the Postal Service desires is not an equilibrium price. Or to put it differently, at the original price (P_1), the decrease in supply causes a shortage driving up the price to a new equilibrium level (P_2). Note that the price doesn't rise by the full amount of the pay increase. In short, a leftward shift in the supply curve causes a movement up the demand curve, resulting in a lower equilibrium quantity (Q_2) and a higher equilibrium price (P_2).

Part 2: The Effect of Email and Text Messaging

Step 1. We've already seen how a pay raise will shift the supply curve to the left. Now let's consider how the invention of email and text messaging affects the market for first-class mail. Begin by drawing a demand and supply model reflecting this relationship.

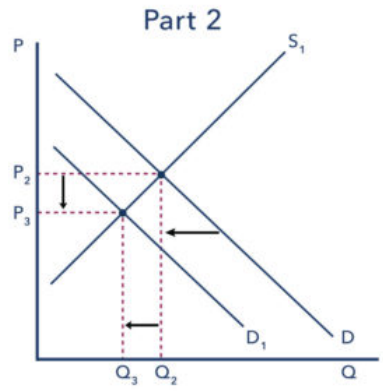


Figure 3. The impact of email and text messages on the snail mail market.

Step 2. Does email and text messaging affect supply or demand?

[reveal-answer q="655707"]Show Answer[/reveal-answer]
[hidden-answer a="655707"]A change in tastes away from snail mail toward digital messages will cause a change in *demand* for the Postal Service.[/hidden-answer]

Step 3. Is the effect on demand positive or negative?

[reveal-answer q="193138"]Show Answer[/reveal-answer]
[hidden-answer a="193138"]A change in tastes away from snail mail toward digital messages causes lower quantity demanded of

postal services at every given price, causing the demand curve for postal services to shift to the left, from D to D_1.[/hidden-answer]

Step 4. Compare the new equilibrium price and quantity to the original equilibrium price.

[reveal-answer q="473433"]Show Answer[/reveal-answer]
[hidden-answer a="473433"]The new equilibrium occurs at a lower quantity and a lower price than the original equilibrium. [/hidden-answer]

To summarize, since many people find email and texting more convenient than sending a letter, we can assume that tastes and preferences for first-class mail will decline. This decrease in demand is shown by a leftward shift in the demand curve and a movement along the supply curve, which creates a surplus in first-class mail at the original price (shown as P_2). The shortage causes a decrease in the equilibrium price (to P_3) and a decrease in the equilibrium quantity (to Q_3). Intuitively, less demand for first-class mail leads to a lower equilibrium quantity and (ceteris paribus) a lower equilibrium price.

Part 3: Combining Factors

Parts 1 and 2 are straightforward, but when we put them together it becomes more complex. Think about it this way: in Part 1, the equilibrium quantity fell due to decreased supply. In Part 2, the equilibrium quantity also fell, this time due to the decreased demand. So putting the two parts together, we would expect to see the final equilibrium quantity (Q_3) to be smaller than the original equilibrium quantity (Q_1). So far, so good.

Now consider what happens to the price. In Part 1, the equilibrium price increased due to the reduction in supply. But in Part 2, the equilibrium price decreased due to the decrease in demand! What will happen to the equilibrium price? The net effect on price can't be determined without knowing which curve shifts more, demand or supply. The equilibrium price could increase, decrease, or stay the same. You just can't tell from graphical analysis alone. This is not unusual. When both curves shift, typically we can determine the overall effect on price or on quantity, but not on both. In this case, we determined the overall effect on the equilibrium quantity, but not on the equilibrium price.

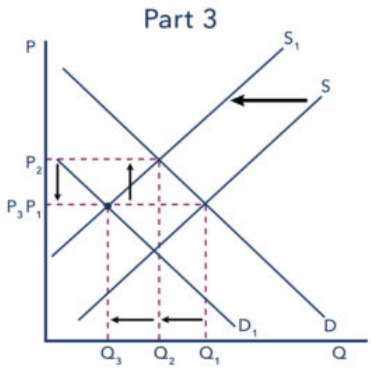


Figure 4. Decreased supply and decreased demand cause the equilibrium quantity to fall (Q3 is be smaller than the original equilibrium quantity of Q1). It is hard to pinpoint what happens to the price, however, as it may decline with the shrinking demand, but also increase with production costs.

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3.23: Changes in Supply and Demand

Learning Objectives

- Describe the differences between changes in demand and changes in the quantity demanded
- Describe the differences between changes in supply and changes in quantity supplied

It's hard to overstate the importance of understanding the difference between shifts in curves and movements along curves. Remember, when we talk about changes in demand or supply, we do not mean the same thing as changes in *quantity demanded* or *quantity supplied*.

A change in **demand** refers to a shift in the entire demand curve, which is caused by a variety of factors (preferences, income, prices of substitutes and complements, expectations, population, etc.). In this case, the entire demand curve moves left or right:

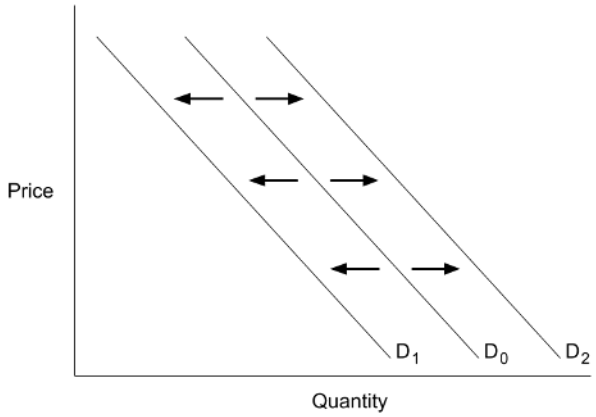


Figure 1. Change in Demand. A change in demand means that the entire demand curve shifts either left or right. The initial demand curve D_0 shifts to become either D_1 or D_2. This could be caused by a shift in tastes, changes in population, changes in income, prices of substitute or complement goods, or changes future expectations.

A change in **quantity demanded** refers to a movement along the demand curve, which is caused only by a change in price. In this case, the demand curve doesn't move; rather, we move along the existing demand curve:

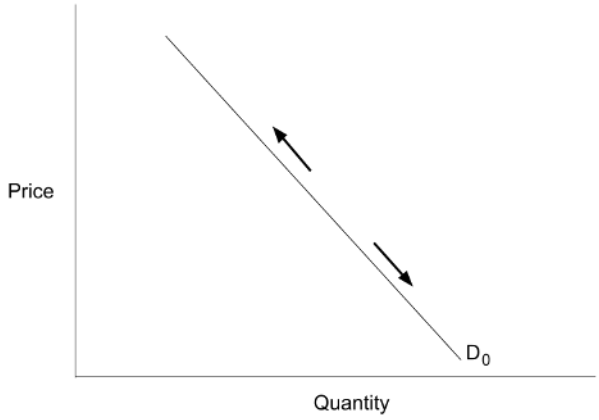


Figure 2. Change in Quantity Demanded. A change in the quantity demanded refers to movement along the existing demand curve, D_0. This is a change in price, which is caused by a shift in the *supply* curve.

Similarly, a change in **supply** refers to a shift in the entire supply curve, which is caused by shifters such as taxes, production costs, and technology. Just like with demand, this means that the entire supply curve moves left or right:



Figure 3. Change in Supply. A change in supply means that the entire supply curve shifts either left or right. The initial supply curve S_0 shifts to become either S_1 or S_2. This is caused by production conditions, changes in input prices, advances in technology, or changes in taxes or regulations.

A change in **quantity supplied** refers to a movement along the supply curve, which is caused only by a change in price. Similar to demand, a change in quantity supplied means that we're moving along the existing supply curve:

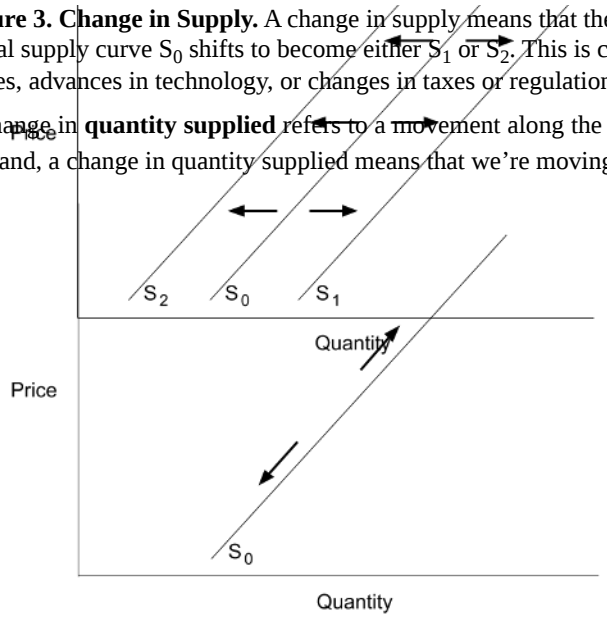


Figure 4. Change in Quantity Supplied. A change in the quantity supplied refers to movement along the existing supply curve, S_0. This is a change in price, caused by a shift in the *demand* curve.

Here's one way to remember: a movement along a demand curve, resulting in a change in quantity demanded, is always caused by a shift in the supply curve. Similarly, a movement along a supply curve, resulting in a change in quantity supplied, is always caused by a shift in the demand curve.

Watch It

Watch this video for another demonstration of the important distinction between these terms.

A link to an interactive elements can be found at the bottom of this page.

Try It

Try graphing each of these situations to determine if they cause a shift in demand, quantity demanded, supply, or quantity supplied.

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https://assessments.lumenlearning.co...sessments/7129

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Learning Objectives

[glossary-page][glossary-term]demand: [/glossary-term]
[glossary-definition]the relationship between the price and the quantity demanded of a certain good or service[/glossary-definition][glossary-term]quantity demanded: [/glossary-term][glossary-definition]the total number of units of a good or service consumers are willing to purchase at a given price[/glossary-definition][glossary-term]quantity supplied: [/glossary-term][glossary-definition]the total number of units of a good or service producers are willing to sell at a given price[/glossary-definition][glossary-term]shift in demand: [/glossary-term]
[glossary-definition]when a change in some economic factor (other than price) causes a different quantity to be demanded at every price[/glossary-definition][glossary-term]shift in supply: [/glossary-term][glossary-definition]when a change in some economic factor (other than price) causes a different quantity to be supplied at every price[/glossary-definition][glossary-term]supply: [/glossary-term]

[glossary-definition]the relationship between price and the quantity supplied of a certain good or service[/glossary-definition]
[/glossary-page]

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3.24: Learn By Doing- Food Trucks and Changes in Equilibrium

Try It

In the following simulation, you will have the opportunity to change the weather and/or change the cost of parking in order to push up the price of food from a food truck. You can play the simulation multiple times to see how different choices lead to different outcomes.

A link to an interactive elements can be found at the bottom of this page.

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CHAPTER OVERVIEW

4: Applications of Supply and Demand

4.1: Why It Matters- Applications of Supply and Demand
4.2: Introduction to Price Ceilings and Price Floors
4.3: Price Ceilings
4.4: Price Floors
4.5: Learn By Doing- Shortage and Surplus
4.6: A Closer Look at Price Controls
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4.11: Learn By Doing- Consumer and Producer Surplus
4.12: Introduction to Labor and Financial Markets
4.13: Labor and Financial Markets
4.14: Putting It Together- Applications of Supply and Demand
4.15: Discussion- Price Controls
4.16: Assignment- Price Controls After a Storm
4.17: Assignment- Problem Set — Applications of Supply and Demand

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4.1: Why It Matters- Applications of Supply and Demand

Why evaluate the applications of supply and demand?

In the module on supply and demand, we defined a free market as one with no government intervention. In this module, we will learn about the applications of supply and demand to explore the outcomes, both anticipated and otherwise, when government *does* intervene in a market.

Economists believe there are a small number of fundamental principles that explain how economic agents respond in different situations. Two of these principles, which we have already been introduced to, are the laws of demand and supply.

Governments can pass laws affecting market outcomes, but no law can negate these economic principles. Rather, the principles will manifest themselves in sometimes unanticipated ways, which may subvert the intent of the government policy. This is one of the major conclusions of this module.

The three best examples of this are:

- Price floors–a legal minimum price in a market, e.g. the minimum wage;
- Price ceilings–a legal maximum price in a market, e.g. rent controls in certain cities;
- Tax incidence–who ends up paying a tax? For example, if the local government adds a sales tax on restaurant meals, is the tax paid by the diners or does it come out of the restaurant's profits? (We'll study more about this in the next module on elasticity.)

Understanding all the effects, both anticipated and unanticipated, of government intervention in a market is critical to determining whether the policy achieves its goal.

As you go through this module, make sure to keep in mind who is a given policy (e.g., a minimum wage) supposed to help? Only then can you evaluate whether the policy is a good one or not. Check out the following video about the minimum wage.

Watch It

The story dates from when the minimum wage was $5.15, but the issues are still relevant today as the discussion continues about further increases in the minimum wage.

A link to an interactive elements can be found at the bottom of this page.

Click through this exercise to briefly learn about two ways that government frequently interferes with a market economy and the consequences these actions have on the market.

A link to an interactive elements can be found at the bottom of this page.

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4.2: Introduction to Price Ceilings and Price Floors

What you'll learn to do: analyze the economic effect of government setting price ceilings and floors



In this section, we will explore the outcomes, both anticipated and otherwise, when government intervenes in a markets either to prevent the price of some good or service from rising "too high" or to prevent the price of some good or service from falling "too low."

First, we will take a look at what happens when prices are held below the equilibrium level. Governments typically set a price ceiling to protect consumers by making necessary products affordable, but you'll come to see how this sometimes backfires by creating a market shortage.

Next, we will see what happens when a price floor forces prices above a minimum standard, such as a minimum wage. While a minimum wage seems like a great benefit for workers, you'll see that some effects of a minimum wage can actually hurt those in the workforce.

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4.3: Price Ceilings

Learning Objectives

- Analyze the consequences of the government setting a binding price ceiling, including the economic impact on price, quantity demanded and quantity supplied
- Compute and demonstrate the market shortage resulting from a price ceiling

Supply and Demand Model

Economists believe there are a small number of fundamental principles that explain how economic agents respond in different situations. Two of these principles, which we have already introduced, are the laws of supply and demand. Governments can pass laws affecting market outcomes, but no law can negate these economic principles. Rather, the laws of supply and demand often become apparent in sometimes unexpected ways, which may undermine the intent of the government policy. This is one of the major conclusions of this section.

Controversy sometimes surrounds the prices and quantities established by supply and demand, especially for products that are considered necessities. In some cases, discontent over prices turns into public pressure on politicians, who may then pass legislation to prevent a certain price from climbing "too high" or falling "too low."

Watch It

Watch this video to see a historical example of what happened to the U.S. economy because of government-enacted price controls in the 1970s.

A link to an interactive elements can be found at the bottom of this page.

The supply and demand model shows how people and firms will react to the incentives that laws provide to control prices, in ways that will often lead to undesirable consequences. Alternative policy tools can often achieve the desired goals of price control laws, while avoiding at least some of their same costs and tradeoffs.

Price Ceilings

Laws that government enacts to regulate prices are called *Price Controls*. Price controls come in two flavors. A **price ceiling** keeps a price from rising above a certain level (the "ceiling"), while a **price floor** keeps a price from falling below a certain level (the "floor"). First, let's use the supply and demand framework to analyze price ceilings.

A price ceiling is a legal maximum price that one pays for some good or service. A government imposes price ceilings in order to keep the price of some necessary good or service affordable. For example, in 2005 during Hurricane Katrina, the price of bottled water increased above $5 per gallon. As a result, many people called for price controls on bottled water to prevent the price from rising so high. In this particular case, the government did not impose a price ceiling, but there are other examples of where price ceilings did occur.

In many markets for goods and services, demanders outnumber suppliers. Consumers, who are also potential voters, sometimes unite behind a political proposal to hold down a certain price. In some cities, such as Albany, renters have pressed political leaders to pass rent control laws, a price ceiling that usually works by stating that rents can be raised by only a certain maximum percentage each year. Some of the best examples of rent controls occur in urban areas, such as New York, Washington D.C., or San Francisco.

Rent control becomes a politically hot topic when rents begin to rise rapidly. Everyone needs an affordable place to live. Perhaps a change in tastes makes a certain suburb or town a more popular place to live. Perhaps locally-based businesses expand, bringing higher incomes and more people into the area. Changes of this sort can cause a change in the demand for rental housing. The interactive graph below (Figure 1) explains how this happens.

A link to an interactive elements can be found at the bottom of this page.

Figure 1 (Interactive Graph). A Price Ceiling Example—Rent Control.

The following table shows the changes in quantity supplied and quantity demanded at each price for the above graphs.

Table 1. Rent Control

Price	Original Quantity Supplied	Original Quantity Demanded	New Quantity Demanded
$400	12,000	18,000	23,000
$500	15,000	15,000	19,000
$600	17,000	13,000	17,000
$700	19,000	11,000	15,000
$800	20,000	10,000	14,000

In the graphs above, we saw what happens when a rent control law is passed to keep the price at the original equilibrium of $500 for a typical apartment. The horizontal line at the price of $500 shows the legally fixed maximum price set by the rent control law. However, the underlying forces that shifted the demand curve to the right are still there. At that price ($500), the quantity supplied remains at the same 15,000 rental units, but the quantity demanded is 19,000 rental units. In other words, the quantity demanded exceeds the quantity supplied, so there is a shortage of rental housing. One of the ironies of price ceilings is that while the price ceiling was intended to help renters, there are actually fewer apartments rented out under the price ceiling (15,000 rental units) than would be the case at the market rent of $600 (17,000 rental units). When a price ceiling is set below the equilibrium price, as in this example, it is considered a **binding price ceiling**, thereby resulting in a shortage.

Price ceilings do not simply benefit renters at the expense of landlords. Rather, some renters (or potential renters) lose their housing as landlords convert apartments to co-ops and condos. Even when the housing remains in the rental market, landlords tend to spend less on maintenance and on essentials like heating, cooling, hot water, and lighting. The first rule of economics is you do not get something for nothing—everything has an opportunity cost. So if renters get “cheaper” housing than the market requires, they tend to also end up with lower quality housing.

Price ceilings have been proposed for other products, for example, for prescription drugs, doctor and hospital fees, the charges made by some automatic teller bank machines, and auto insurance rates. The general results of any price ceiling are the same: price ceilings are enacted in an attempt to keep prices low for those who need the product. But when the market price is not allowed to rise to the equilibrium level, quantity demanded exceeds quantity supplied, and thus a shortage occurs. Those who manage to purchase the product at the lower price given by the price ceiling will benefit, but sellers of the product will suffer, along with those who are not able to purchase the product at all. To the extent that producers cannot easily reduce the quantity supplied, they will tend to allow the quality to decline.

Try It

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https://assessments.lumenlearning.co...sessments/6975

Watch It

The following video explores the effects of price ceilings. The speakers identify five major consequences:

1. Shortages
2. Reduced quality
3. Wasted time and resources
4. Deadweight loss, or a loss of gains from trade
5. Misallocation of resources

The first two consequences are explained in the video. We’ll address the others later in the module in the discussion of efficiency.

A link to an interactive elements can be found at the bottom of this page.

Glossary

[glossary-term]binding price ceiling[/glossary-term][glossary-definition]when a price ceiling is set below the equilibrium price, resulting in a shortage[/glossary-definition][glossary-term]price ceiling: [/glossary-term][glossary-definition]a legal maximum price for a product [/glossary-definition][glossary-term]price floor: [/glossary-term][glossary-definition]a legal minimum price for a product[/glossary-definition]

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4.4: Price Floors

Learning Objectives

- Analyze the consequences of the government setting a binding price floor, including the economic impact on price, quantity demanded and quantity supplied
- Compute and demonstrate the market surplus resulting from a price floor

Price Floors

A **price floor** is the lowest price that one can legally charge for some good or service. Perhaps the best-known example of a price floor is the minimum wage, which is based on the view that someone working full time should be able to afford a basic standard of living. The federal minimum wage in 2016 was $7.25 per hour, although some states and localities have a higher minimum wage. The federal minimum wage yields an annual income for a single person of $15,080, which is slightly higher than the Federal poverty line of $11,880. As the cost of living rises over time, the Congress periodically raises the federal minimum wage.



Figure 1. Protesters call for a $15 minimum wage.

Price floors are sometimes called “price supports,” because they support a price by preventing it from falling below a certain level. Around the world, many countries have passed laws to create agricultural price supports. Farm prices and thus farm incomes fluctuate, sometimes widely. Even if, on average, farm incomes are adequate, some years they can be quite low. The purpose of price supports is to prevent these swings.

The most common way price supports work is that the government enters the market and buys up the product, adding to demand to keep prices higher than they otherwise would be. According to the Common Agricultural Policy reform passed in 2013, the European Union (EU) will spend about 60 billion euros per year, or 67 billion dollars per year (with the November 2016 exchange rate), or roughly 38% of the EU budget, on price supports for Europe’s farmers from 2014 to 2020.

Figure 2 illustrates the effects of a government program that assures a price above the equilibrium by focusing on the market for wheat in Europe. In the absence of government intervention, the price would adjust so that the quantity supplied would equal the quantity demanded at the equilibrium point E_0, with price P_0 and quantity Q_0. However, policies to keep prices high for farmers keeps the price above what would have been the market equilibrium level—the price Pf shown by the dashed horizontal line in the diagram. The result is a quantity supplied in excess of the quantity demanded (Qd). When quantity supplied exceeds quantity demanded, a surplus exists. When a price floor is set above the equilibrium price, as in this example, it is considered a **binding price floor**.

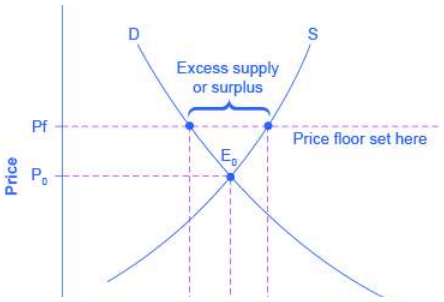
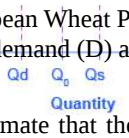


Figure 2. European Wheat Prices: A Price Floor Example. The intersection of demand (D) and supply (S) would be at the equilibrium point E_0.



Economists estimate that the high-income areas of the world, including the United States, Europe, and Japan, spend roughly $1 billion per day in supporting their farmers. If the government is willing to purchase the excess supply (or to provide payments for others to purchase it), then farmers will benefit from the price floor, but taxpayers and consumers of food will pay the costs through higher taxes and higher prices. Agricultural economists and policy makers have offered numerous proposals for reducing farm subsidies. In many countries, however, political support for subsidies for farmers remains strong. This is either because the population views this as supporting the traditional rural way of life or because of industry's lobbying power of the agro-business.

Try It

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Try It

This next question allow you to get as much practice as you need, as you can click the link at the top of the question ("Try another version of this question") to get a new version of the question. Practice until you feel comfortable with this concept.
[ohm_question]151209[/ohm_question]

Watch It

We mentioned earlier that the minimum wage is a good example of a price floor, since employers are required to pay no less than the minimum wage for workers. The following video makes a strong case for why a minimum wage causes a surplus of labor, i.e. unemployment. As you watch it, consider what you think about a minimum wage.

A link to an interactive elements can be found at the bottom of this page.

Do price ceilings and floors change demand or supply?

Neither price ceilings nor price floors cause demand or supply to change. They simply set a price that limits what can be legally charged in the market. Remember, changes in price do not cause demand or supply to change. In other words, they do not change the equilibrium. Price ceilings and price floors can cause a different choice of quantity demanded along a demand curve, but they do not move the demand curve. Price controls can cause a different choice of quantity supplied along a supply curve, but they do not shift the supply curve.

Learning Objectives

[glossary-page][glossary-term]binding price floor[/glossary-term]
[glossary-definition]when a price floor is set above the equilibrium price and results in a surplus[/glossary-definition][glossary-term]price ceiling: [/glossary-term][glossary-definition]a legal maximum price[/glossary-definition][glossary-term]price control: [/glossary-term]
[glossary-definition]government laws to regulate prices instead of letting market forces determine prices[/glossary-definition]
[glossary-term]price floor: [/glossary-term][glossary-definition]a legal minimum price for a product[/glossary-definition]
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4.5: Learn By Doing- Shortage and Surplus

Try It

Rather than have you read more about shortage and surplus, we'd prefer to have you practice what you've learned so far and see for yourself if you understand it.

These questions allow you to get as much practice as you need, as you can click the link at the top of the first question ("Try another version of these questions") to get a new version of the questions. Practice until you feel comfortable doing these questions.

Note that you'll use the information provided in the first question for all of the questions on this page.

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4.6: A Closer Look at Price Controls

Learning Objectives

- Analyze the economic effect of government setting price ceilings and floors

Price Controls

People often expect the government to solve problems that they seem unable to solve on their own. Sometimes this is effective and sometimes it is not. Price controls, either price ceilings or price floors, often have unanticipated side effects. Think about it—passing a law doesn't by itself make economic problems go away!

Such is the case with claims of price gouging or the charging of "excessively high" prices, as is sometimes reported in the wake of natural disasters, like the need for water after Hurricane Katrina or the need for gas following Hurricane Harvey. Imposing a price ceiling below the equilibrium price may create as many problems as it solves. The problem originates from the fact that the demand for the good increases suddenly and dramatically. After Katrina, freshwater supplies were compromised and bottled water was hard to access because of the storm damage, so the price of bottled water increased above $5 per gallon. while the supply of bottled water was less as a result of storm damage. The question is how to deal with the shortage, that is, how to allocate the limited supply of bottled water among competing needs and wants. Figure 1 depicts the example of a hypothetical price control for water after Hurricane Katrina.

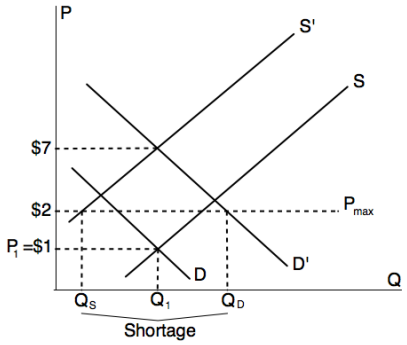


Figure 1. Price control for water after Hurricane Katrina. D and S show the original demand and supply curves, with equilibrium at $1. After the hurricane, demand for water shifted to the right at D'. Similarly, the limited supply of water shifted the supply curve to the left at S'. While the new equilibrium price would be $7, the price ceiling of $2 results in a shortage.

When a price ceiling reduces the legal price of a product, businesses have less incentive to supply the product. Economically speaking, the law of supply says that at lower prices, the quantity supplied will be lower. At the same time, the law of demand states that at a lower price, the quantity demanded will be higher. This can be seen clearly in the graph. Suppose there is a price ceiling at $2 per gallon of bottled water. The quantity demanded is shown in the figure as Qd. The quantity supplied is shown as Qs. Since Qs < Qd, there is a shortage. So who gets the limited supply?

Unfortunately, there is no clear answer to this. It could be first come, first serve. It could be friends of the seller. In many cases, what results are under-the-table payments by consumers willing to violate the law. What is certain is that less bottled water gets to consumers than would be the case if the price were allowed to rise. Many would argue that this shortfall is not the best outcome.

Link It Up

Click here to watch a relatively recent example of food shortages in Venezuela.

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4.7: Introduction to Surplus

What you'll learn to do: define, calculate, and illustrate consumer, producer, and total surplus



Earlier in this course we introduced the concept of efficiency and pointed out that there are several types. Productive efficiency means producing the most output possible with the available resources. In other words, it means producing without waste. If you recall the production possibilities frontier, operating inside the frontier means the society is not producing efficiently, since all resources are not being used. Productive efficiency occurs only on the PPF.

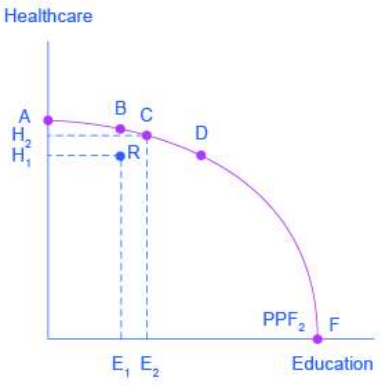


Figure 1. **Productive and Allocative Efficiency.** This graph shows the production possibilities frontier for education and healthcare. All choices along the PPF (points A, B, C, D, and F) display productive efficiency. Any point inside the production possibilities frontier (R) is productively inefficient and wasteful because it's possible to produce more of one good, the other good, or some combination of both goods

But there are an infinite number of points on the PPF. What is the optimal point on the PPF, or what is the optimal quantity of each good for society to produce? The answer to this critically important question is given by allocative efficiency. Allocative efficiency maximizes the net social benefit of some product. These same ideas about efficiency can be applied to individual markets. When markets are free and competitive, equilibrium results in the efficient amount of a good or service is produced. By contrast, anytime there is a price ceiling or price floor, or when market participants do not buy and sell at the equilibrium price, the amount of the product being supplied will be inefficient. and society will suffer a deadweight loss.

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4.8: Trade and Efficiency

Learning Objectives

- Explain why voluntary trade benefits both parties and why it leads to allocative efficiency

Getting a Good Deal or Making a Good Deal

Why do people make transactions? Is it because the seller has a surplus of goods or the buyer has a shortage of them? Not exactly. The short answer is that people make transactions because they value the same goods differently at the margin. Remember that marginal analysis involves weighing the benefits and costs of choosing a little bit more or a little bit less of a good.



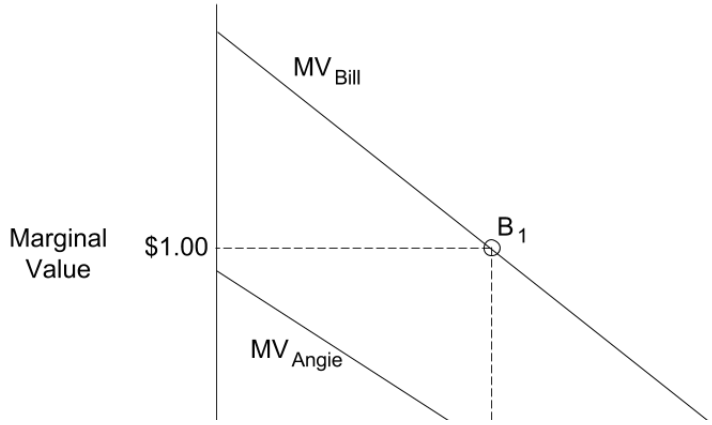
Figure 1. How much would you value this apple?

Suppose Bill loves to snack on apples, while Angie thinks apples are just okay. Suppose they each have a basket containing a dozen apples. Because Bill loves apples, he places a higher value on one more apple than Angie does. That's what "at the margin" means. Bill is considering one more apple. Suppose Bill thinks another apple would be worth $1.00, while Angie thinks another apple is only worth $0.10. If Bill offered to buy an apple for $0.50 from Angie, would she agree to the transaction?

Since Angie thinks the apple is only worth $0.10, then it would be to her advantage to sell one to Bill and use the $0.40 profit for something she values more than apples. Would Bill benefit from the deal? Since he thinks an apple is worth a dollar, if he could get it for fifty cents, he would be making $0.50 profit. If two parties differ on what some good is worth, they can *each* benefit from trading the good from the person who values it less to the person who values it more.

If trading one apple is good for both parties, would trading more be better? What motivated the transaction in the first place? It was the difference in opinion between Bill and Angie about what an apple is worth. The value one places on an item depends on tastes in general (in this case it was taste for apples), and how much more of a good a person would like (or how many apples were already consumed). If Angie is very hungry, it's likely she would value an apple more than normal. Similarly, if Bill had just eaten five apples, he probably would value one more less than he normally values apples.

This suggests another idea we've looked at before: the **law of diminishing marginal utility**. Because of diminishing marginal returns, the more of something you already have, the less one more unit is worth to you. Thus, we can graph Bill's marginal value curve as shown in Figure 1. Similarly, Angie's marginal value curve has a similar shape, but it's lower on the graph to reflect the fact that Angie likes apples less than Bill does.



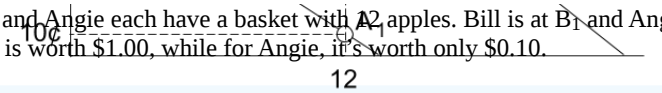


Figure 1. Bill and Angie each have a basket with 12 apples. Bill is at B_1 and Angie is at A_1. Bill likes apples more than Angie. For Bill, the 12th apple is worth $1.00, while for Angie, it's worth only $0.10.

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Trade and Efficiency

What this means is that the more apples Bill has, the less he values another. Similarly, the less apples Angie has, the more she values one more. Thus, as Angie sells more apples to Bill, her marginal value increases while his decreases. That suggests an answer to the question posed above: Bill and Angie should keep trading apples until they place the same value on them. This is shown in Figure 2, where Bill has bought three apples from Angie. At that point, they will have maximized the benefits from trading apples. Economists describe these benefits from trading as an improvement in **allocative efficiency.** [1]

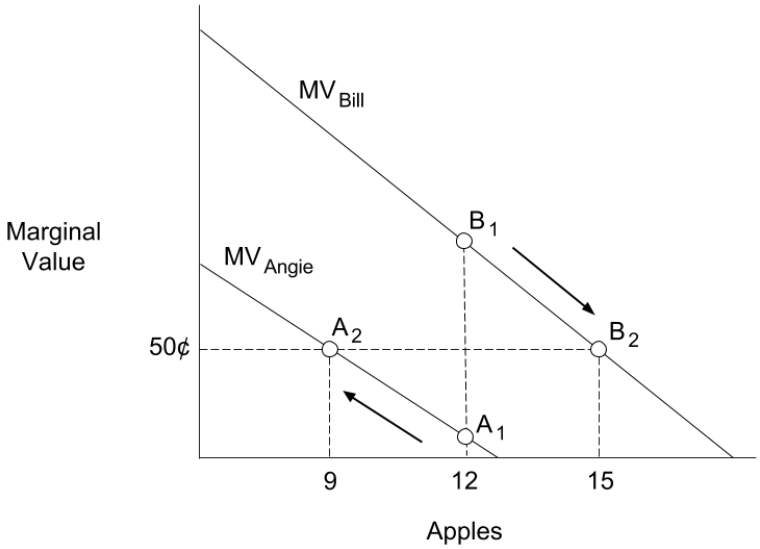


Figure 2. Bill buys apples from Angie, moving down his MV curve to B_2. As Angie sells apples to Bill, she moves up her MV curve to A_2. Trading stops after 3 apples when Bill and Angie each value apples the same, at a price of $0.50 each.

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Learning Objectives

[glossary-page][glossary-term]allocative efficiency: [/glossary-term]
[glossary-definition]when benefits of trade are maximized and the mix of goods being produced represents the mix that society most desires[/glossary-definition][glossary-term]law of diminishing marginal utility: [/glossary-term][glossary-definition]as we consume more of a good or service, the utility we get from additional units of the good or service tend to become smaller than what we received from earlier units[/glossary-definition][glossary-term]marginal analysis:[/glossary-term][glossary-definition] comparing the benefits and costs of choosing a little more or a little less of a good. [/glossary-definition][/glossary-page]

1. This page summarizes ideas from Chapter 3 of Armen A. Alchian & William R. Allen, Exchange & Production: Competition, Coordination, & Control, Wadsworth Publishing Company, Belmont, California. 1983. ↵

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4.9: Consumer and Producer Surplus

Learning Objectives

- Explain, calculate, and illustrate consumer surplus
- Explain, calculate, and illustrate producer surplus
- Explain, calculate, and illustrate social surplus

Demand, Supply and Efficiency

The familiar demand and supply diagram holds within it the concept of allocative efficiency. One typical way that economists define efficiency is when it is impossible to improve the situation of one party without imposing a cost on another. Conversely, if a situation is inefficient, it becomes possible to benefit at least one party without imposing costs on others.

Efficiency in the demand and supply model has the same basic meaning: the economy is getting as much benefit as possible from its scarce resources and all the possible gains from trade have been achieved. In other words, the optimal amount of each good and service is being produced and consumed.

Consumer Surplus, Producer Surplus, Social Surplus

Consider a market for tablet computers, as shown in Figure 1. We usually think of demand curves as showing what quantity of some product consumers will buy at any price, but a demand curve can also be read the other way. If we choose a quantity of output, the demand curve shows the maximum price consumers would be willing to pay for that quantity. According to the demand curve in Figure 1, if producers wanted to sell a quantity of 20 million tablets, some customers are willing to pay $90 each (see point J.) In other words, a tablet is worth $90 to those customers.

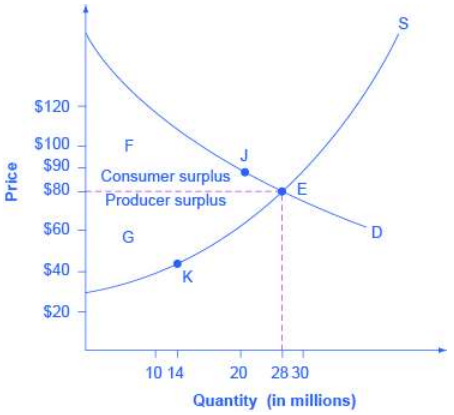


Figure 1.Consumer and Producer Surplus. The somewhat triangular area labeled by F in the graph shows the area of consumer surplus, which shows that the equilibrium price in the market was less than what many of the consumers were willing to pay. The somewhat triangular area labeled by G shows the area of producer surplus, which shows that the equilibrium price received in the market was more than what many of the producers were willing to accept for their products.

However, that doesn't mean that those customers will end up paying $90. Figure 1 shows that the equilibrium price is $80 and the equilibrium quantity is 28 million tablets. At that price, each customer who would have been willing to pay $90 for a tablet is getting a good deal. We all know what a good deal is—it's when you get something for less than you think it's worth. We don't have to stop there. If suppliers chose to produce only 14 tables (as shown in point K), we can look at Figure 1 and up to the demand curve to see that some customers would have been willing to pay about $115 for a tablet at this quantity produced. What that means is that this subset of customers got an even better deal at the equilibrium price.

The demand curve shows what consumers are willing to pay for any given quantity of tablets. In other words, the height of the demand curve at any quantity shows what some consumers think those tablets are worth. We can formalize this idea of how good a

deal consumers get on a transaction using the concept of **consumer surplus.**

Since a demand curve traces consumers' willingness to pay for different quantities, we can define the gain to consumers as the difference between what they would have been willing to pay and the price that they actually paid. At point J, consumers were willing to pay $90, but they were able to purchase tablets at the equilibrium price of $80, so they gained $10 of extra value on each tablet. This is exactly analogous to the "profit" Bill earned from buying apples that we described in the previous page of reading. If we add up the gains at every quantity, we can measure the consumer surplus as the area under the demand curve up to the equilibrium quantity and above the equilibrium price. In Figure 1, the consumer surplus is the area labeled F.

The supply curve shows the quantity that firms are willing to supply at each price. For example, point K in Figure 1 illustrates that firms would have been willing to supply a quantity of 14 million tablets at a price of $45 each. Those producers were instead able to charge the equilibrium price of $80, clearly receiving an extra benefit beyond what they required to supply the product. The amount that a seller is paid for a good minus the seller's actual cost is called **producer surplus**. In Figure 1, producer surplus is the area labeled G—that is, the area between the market price and the segment of the supply curve below the equilibrium.

To summarize, producers created and sold 28 tablets to consumers. Both producers and consumers benefited. The value of the tablets is the area under the demand curve up to the equilibrium quantity. The cost to produce that value is the area under the supply curve. The new value created by the transactions, i.e. the net gain to society, is the area between the supply curve and the demand curve, that is, the sum of producer surplus and consumer surplus. This sum is called **social surplus**, also referred to as economic surplus or total surplus. In Figure 1 we show social surplus as the area F + G. Social surplus is larger at the equilibrium quantity and price than it would be at any other quantity. This is what economists mean when they say that market equilibrium is (perfectly) allocatively efficient. At the efficient level of output, it is impossible to produce greater consumer surplus without reducing producer surplus, and it is impossible to produce greater producer surplus without reducing consumer surplus. In other words, the consumer and producers gains from exchange are maximized at the equilibrium point.

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Watch It

In this video, you'll consider the holiday market for Santa hats. The market is efficient and both consumer and producer surplus are maximized at the equilibrium point of $5.

If the government establishes a price ceiling, a shortage results, which also causes the producer surplus to shrink, and results in inefficiency called **deadweight loss**.

If government implements a price floor, there is a surplus in the market, the consumer surplus shrinks, and inefficiency produces deadweight loss.

A link to an interactive elements can be found at the bottom of this page.

Example: Calculate consumer surplus



Figure 2. Consumer and producer surpluses are shown as the area where consumers *would have* been willing to pay a higher price for a good or the price where producers *would have* been willing to sell a good.

In the sample market shown in the graph, equilibrium price is $10 and equilibrium quantity is 3 units. The consumer surplus area is highlighted above the equilibrium price line. This area can be calculated as the area of a triangle.

Recall that to find the area of a triangle, you will need to know its base and height. Refer to the following example if you need a refresher.

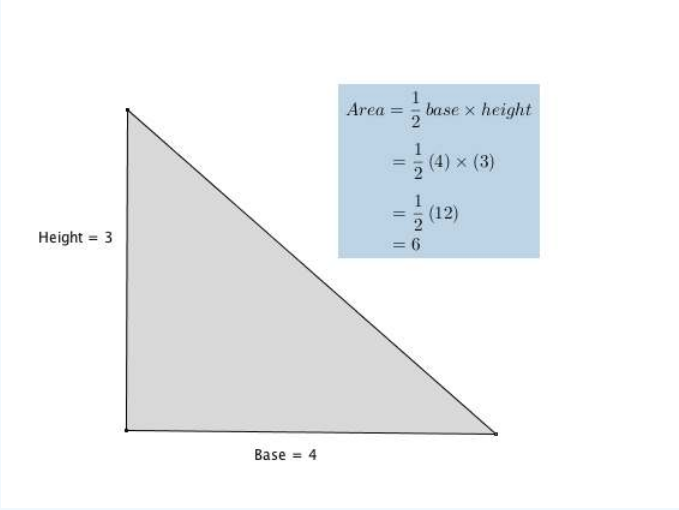


Figure 3. The area of a triangle.

Let's apply the calculation for the area of a triangle to our example market to see the added value that consumers will get for this item at the equilibrium price in our sample market.

Step 1: Define the base and height of the consumer surplus triangle.

The base of the consumer surplus triangle is 3 units long. Be careful when you define the height of this triangle, it is tempting to say it is 25, can you see why it isn't? The height is determined by the distance from the equilibrium price line and where the demand curve intersects the vertical axis. The height of the triangle begins at $10 and ends at $25, so it will be $25 – $10 = $15

b = 3

h = 15

Step 2: Apply the values for base and height to the formula for the area of a triangle.

$$A = \frac{1}{2}b\times h$$

$$A = \frac{1}{2}3\times 15$$

$$A = \frac{1}{2}45$$

$$A = \frac{45}{2} = 22.5$$

Try It

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Learning Objectives

[glossary-page][glossary-page][glossary-term]deadweight loss: [/glossary-term][glossary-definition]the loss in social surplus that occurs when a market produces an inefficient quantity[/glossary-definition][glossary-term]producer surplus: [/glossary-term][glossary-definition]the value to producers of their sales above their cost of production [/glossary-definition][glossary-term]social (or economic or total) surplus: [/glossary-term][glossary-definition]the sum of consumer and producer surplus at some quantity and price of output[/glossary-definition][/glossary-page]

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4.10: Inefficiency of Price Floors and Price Ceilings

Learning Objectives

- Explain how price floors and price ceilings can be inefficient

We demonstrated that market equilibrium maximizes social surplus; thus, the equilibrium quantity is the most efficient quantity of output for society. The imposition of a price floor or a price ceiling will prevent a market from adjusting to its equilibrium price and quantity, and thus will create an inefficient outcome. But there is an additional twist here. Along with creating inefficiency, price floors and ceilings also transfer some consumer surplus to producers, or some producer surplus to consumers.

In the following interactive graph (Figure 1), we can see this transfer in action:

A link to an interactive elements can be found at the bottom of this page.

Figure 1 (Interactive Graph). Inefficiency of Price Ceilings.

As a result of the transfer of consumer surplus to producers (or producer surplus to consumers), two changes occur. First, an inefficient outcome occurs and the total surplus of society is reduced. The loss in social surplus that occurs when the economy produces at an inefficient quantity is called **deadweight loss**. In a very real sense, it is like money thrown away that benefits no one. In the last slide of the above activity, you can see the deadweight loss shown as the area U + W. When deadweight loss exists, it is possible for both consumer and producer surplus to be higher, in this case because the **price control** is blocking some suppliers and demanders from transactions that would be beneficial to both.

A second change from the price ceiling is that some of the producer surplus is transferred to consumers. After the price ceiling is imposed, the new consumer surplus is T + V, while the new producer surplus is X. In other words, the price ceiling transfers the area of surplus (V) from producers to consumers. Note that the gain to consumers is less than the loss to producers, which is just another way of seeing the deadweight loss.

Let's look at another interactive graph (Figure 2), this time with a price floor instead of a price ceiling:

An interactive or media element has been excluded from this version of the text. You can view it online here: http://pb.libretexts.org/mlum/?p=186

Figure 2 (Interactive Graph). Inefficiency of Price Floors.

The net effect of the price floor in the above activity is that the price floor causes the area H to be transferred from consumer to producer surplus, but also causes a deadweight loss of J + K.

This analysis shows that a price ceiling, like a law establishing rent controls, will transfer some producer surplus to consumers—which helps to explain why consumers often favor them. Conversely, a price floor like a guarantee that farmers will receive a certain price for their crops will transfer some consumer surplus to producers, which explains why producers often favor them. However, both price floors and price ceilings block some transactions that buyers and sellers would have been willing to make, and creates deadweight loss. Removing such barriers, so that prices and quantities can adjust to their equilibrium level, will increase the economy's social surplus.

Summary

Consumer surplus is the gap between the price that consumers are willing to pay, based on their preferences, and the market equilibrium price. Producer surplus is the gap between the price for which producers are willing to sell a product, based on their costs, and the market equilibrium price. Social surplus is the sum of consumer surplus and producer surplus. Social surplus is greater at the equilibrium quantity and price than it will be at any other quantity and price. Deadweight loss is loss in social surplus that occurs when the economy produces at an inefficient quantity.

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Learning Objectives

[glossary-page][glossary-term]deadweight loss: [/glossary-term]
[glossary-definition]the loss of economic value (i.e. social surplus) that occurs when a market operates at an inefficient quantity of output[/glossary-definition][/glossary-page]

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4.11: Learn By Doing- Consumer and Producer Surplus

Rather than have you read more about consumer and producer surplus, we'd prefer to have you practice what you've learned so far and see for yourself if you understand it.

These questions allow you to get as much practice as you need, as you can click the link at the top of the first question ("Try another version of this question") to get a new version of the questions. Practice until you feel comfortable doing these questions.

Try It

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Try It

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4.12: Introduction to Labor and Financial Markets

What you'll learn to do: examine ways that supply and demand apply to labor and financial markets



So far in this module, you have examined applications of supply and demand and how these concepts explain shortages, surpluses, and allocative efficiency. In this section, we will look at a couple more examples of supply and demand, and instead of focusing on markets for goods and services, we will see how these same principles apply to labor and financial markets.

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4.13: Labor and Financial Markets

Learning Objectives

- Describe how the theories of supply & demand can be applied labor markets and financial markets
- Use the four-step process to predict how economic conditions cause a change in supply, demand, and equilibrium

The theories of supply and demand do not apply just to markets for goods. They apply to any market, even markets for labor and financial services. **Labor markets** are markets for employees or jobs. **Financial markets** are markets for saving or borrowing.

When we think about demand and supply curves in goods and services markets, it is easy to picture who the demanders and suppliers are: businesses produce the products and households buy them. Who are the demanders and suppliers in labor and financial service markets? In labor markets job seekers (individuals) are the suppliers of labor, while firms and other employers who hire labor are the demanders for labor. For example, the grocery store needs workers, or in other words, has a demand for labor. That labor is supplied by grocery workers. In financial markets, any individual or firm who saves contributes to the supply of money, and any who borrows (person, firm, or government) contributes to the demand for money.

As a college student, you most likely participate in both labor and financial markets. Employment is a fact of life for most college students: in 2011, according to the BLS, 52% of undergraduates worked part time and another 20% worked full time. Most college students are also heavily involved in financial markets, primarily as borrowers. Among full-time students, about half take out a loan to help finance their education each year, and those loans average about $6,000 per year. Many students also borrow for other expenses, like purchasing a car. We can analyze labor markets and financial markets with the same tools we use to analyze demand and supply in the goods markets. Let's take a look at a few examples.

Supply and Demand in Labor Markets

Economic events can change the equilibrium salary (or wage) and quantity of labor. Consider how the wave of new information technologies, like computer and telecommunications networks, has affected low-skill and high-skill workers in the U.S. economy. From the perspective of employers who demand labor, these new technologies are often a substitute for low-skill laborers like file clerks who used to keep file cabinets full of paper records of transactions. However, the same new technologies are a complement to high-skill workers like managers, who benefit from the technological advances by being able to monitor more information, communicate more easily, and juggle a wider array of responsibilities. So, how will the new technologies affect the wages of high-skill and low-skill workers? For this question, let's again use the four-step process of analyzing how shifts in supply or demand affect a market.

Technology and Wage Inequality: The Four-Step Process

Step 1. What did the markets for low-skill labor and high-skill labor look like before the arrival of the new technologies?

In Figure 1(a) and Figure 1(b), S_0 is the original supply curve for labor and D_0 is the original demand curve for labor in each market. In each graph, the original point of equilibrium, E_0, occurs at the price W_0 and the quantity Q_0.

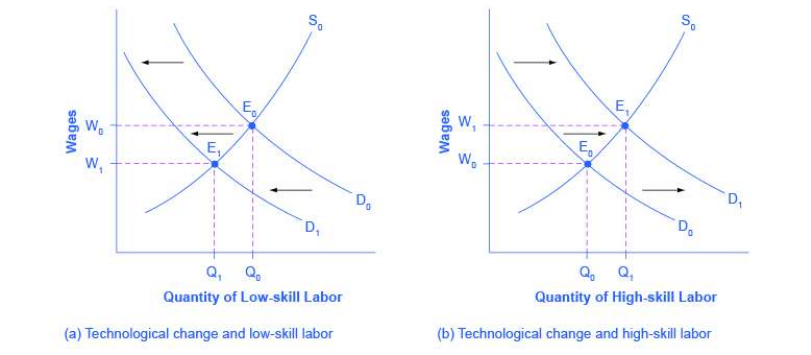


Figure 1. (a) The demand for low-skill labor shifts to the left when technology can do the job previously done by these workers. (b) New technologies can also increase the demand for high-skill labor in fields such as information technology and network administration.

Step 2. Does the new technology affect the supply of labor from households or the demand for labor from firms?

[reveal-answer q="560678"]Show Answer[/reveal-answer]
[hidden-answer a="560678"]The technology change described here affects demand for labor by firms that hire workers.[/hidden-answer]

Step 3. Will the new technology increase or decrease demand?

[reveal-answer q="110674"]Show Answer[/reveal-answer]
[hidden-answer a="110674"]Based on the description earlier, as the substitute for low-skill labor becomes available, demand for low-skill labor will

shift to the left, from D_0 to D_1. As the technology complement for high-skill labor becomes cheaper, demand for high-skill labor will shift to the right, from D_0 to D_1.[/hidden-answer]

Step 4. Compare the new equilibrium price and quantity to the original equilibrium price.

[reveal-answer q="72321"]Show Answer[/reveal-answer]
[hidden-answer a="72321"]The new equilibrium for low-skill labor, shown as point E_1 with price W_1 and quantity Q_1, has a lower wage and quantity hired than the original equilibrium, E_0. The new equilibrium for high-skill labor, shown as point E_1 with price W_1 and quantity Q_1, has a higher wage and quantity hired than the original equilibrium (E_0).[/hidden-answer]

So, the demand and supply model predicts that the new computer and communications technologies will raise the pay of high-skill workers but reduce the pay of low-skill workers. Indeed, from the 1970s to the mid-2000s, the wage gap widened between high-skill and low-skill labor. According to the National Center for Education Statistics, in 1980, for example, a college graduate earned about 30% more than a high school graduate with comparable job experience, but by 2012, a college graduate earned about 60% more than an otherwise comparable high school graduate. Many economists believe that the trend toward greater wage inequality across the U.S. economy was primarily caused by the new technologies.

Supply and Demand in Financial Markets

Now let's examine how the theories of supply and demand also affect financial markets. Imagine that the U.S. economy became viewed as a less desirable place for foreign investors to put their money because of fears about the growth of the U.S. public debt. Using the four-step process for analyzing how changes in supply and demand affect equilibrium outcomes, how would increased U.S. public debt affect the equilibrium price and quantity for capital in U.S. financial markets?

THE EFFECT OF GROWING U.S. DEBT: The Four-Step Process

Step 1. Draw a diagram showing demand and supply for financial capital that represents the original scenario in which foreign investors are pouring money into the U.S. economy.

Figure 2 shows a demand curve, D, and a supply curve, S, where the supply of capital includes the funds arriving from foreign investors. The original equilibrium E_0 occurs at interest rate R_0 and quantity of financial investment Q_0.

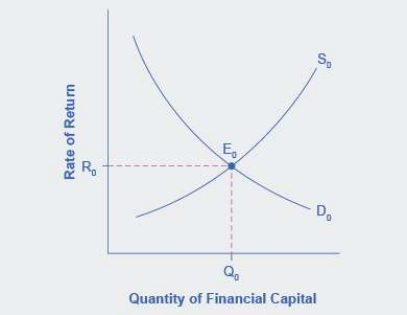


Figure 2. The graph shows the demand for financial capital and supply of financial capital into the U.S. financial markets by the foreign sector before the increase in uncertainty regarding U.S. public debt. The original equilibrium (E_0) occurs at an equilibrium rate of return (R_0) and the equilibrium quantity is at Q_0.

Step 2. Will the diminished confidence in the U.S. economy as a place to invest affect demand or supply of financial capital?

[reveal-answer q="346682"]Show Answer[/reveal-answer]
[hidden-answer a="346682"]Yes, it will affect supply. Many foreign investors look to the U.S. financial markets to store their money in safe financial vehicles with low risk and stable returns. As the U.S. debt increases, debt servicing will increase—that is, more current income will be used to pay the interest rate on past debt. Increasing U.S. debt also means that businesses may have to pay higher interest rates to borrow money, because business is now competing with the government for financial resources.[/hidden-answer]

Step 3. Will supply increase or decrease? When the enthusiasm of foreign investors' for investing their money in the U.S. economy diminishes, the supply of financial capital shifts to the left. Figure 3 shows the supply curve shift from S_0 to S_1.

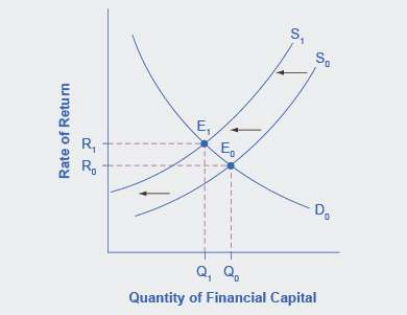


Figure 3. The graph shows the demand for financial capital and supply of financial capital into the U.S. financial markets by the foreign sector before and after the increase in uncertainty regarding U.S. public debt. The original equilibrium (E_0) occurs at an equilibrium rate of return (R_0) and the equilibrium quantity is at Q_0.

Step 4. Compare the new equilibrium price and quantity to the original equilibrium price.

[reveal-answer q="121808"]Show Answer[/reveal-answer]
[hidden-answer a="121808"]Foreign investors' diminished enthusiasm leads to a new equilibrium, E_1, which occurs at the higher interest rate, R_1, and the lower quantity of financial investment, Q_1.[/hidden-answer]

The economy has experienced an enormous inflow of foreign capital. According to the U.S. Bureau of Economic Analysis, by the third quarter of 2014, U.S. investors had accumulated $24.6 trillion of foreign assets, but foreign investors owned a total of $30.8 trillion of U.S. assets. If foreign investors were to pull their money out of the U.S. economy and invest elsewhere in the world, the result could be a significantly lower quantity of financial investment in the United States, available only at a higher interest rate. This reduced inflow of foreign financial investment could impose hardship on U.S. consumers and firms interested in borrowing.

In a modern, developed economy, financial capital often moves invisibly through electronic transfers between one bank account and another. Yet these flows of funds can be analyzed with the same tools of demand and supply as markets for goods or labor.

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https://assessments.lumenlearning.co...sessments/7141

https://assessments.lumenlearning.co...sessments/7142

Learning Objectives

[glossary-page][glossary-term]financial markets: [/glossary-term]
[glossary-definition]supply and demand for financial services; i.e. saving & borrowing[/glossary-definition][glossary-term]labor markets: [/glossary-term][glossary-definition]supply and demand for jobs[/glossary-definition][/glossary-page]

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4.14: Putting It Together- Applications of Supply and Demand

This module showed that the theories of supply and demand can be applied to a variety of real world issues. Market outcomes can be evaluated based on the amount of net value created for society, which can be measured by consumer, producer and social surplus. Price ceilings and price floors result in deadweight loss–the loss of economic value caused by operating at an inefficient quantity of output.

Let's return to the example of the minimum wage. Careful analysis shows that imposition of, or increases in the minimum wage have significant distributional effects. In other words, there are winners and losers from the policy. The winners are workers who continue to have a job, but are now paid a higher salary. The losers are businesses who have to pay more for their employees. This increase in production costs will be passed on, in part to consumers who will end up paying higher prices for the businesses' products. So consumers lose also. The big losers, though, are the people who had jobs at the lower wage, but lose them when the minimum wage is increased. Which employees are most likely to lose their jobs, the most experienced and skilled, or the least experienced and skilled? Don't forget that ultimately what matters is the size of these effects. These are the technical details that policy analysts will look at before making any recommendations to decision makers.



Figure 1. Groupon Gift Card. Image by Mike Mozart, CC-BY.

Consider Groupon, a website which offers significant discounts on purchases at businesses people frequently use. It's not unusual to obtain 50% off the normal price. Why do customers like Groupon? Because it increases the consumer surplus they obtain on purchases.

Why do businesses offer Groupon campaigns? Part of it is advertising, to attract customers who aren't familiar with those businesses. Some businesses offer regular Groupon deals. They must be doing this to increase their producer surplus (i.e., profit). This is likely part of a larger strategy, called *price discrimination*, which you will learn more about when you study the theory of the firm. For now, it is enough to understand that Groupon campaigns enhance producer surplus.

Since both consumer surplus and producer surplus increase, we can say that total economic (or social) surplus has increased. This is just another way of saying that transactions benefit both parties, or as economists would say, this is a more efficient outcome for society. Computing the additional consumer and producer surplus tells us by how much economic surplus has increased.

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4.15: Discussion- Price Controls

Respond to the following prompt in a post with a minimum of 250 words, then comment on at least TWO other posts. Respond to the posts indicating your agreement or disagreement with their position and why. Feel free to bring in additional references to these reply posts.

- Find a current news article or video (within the past 12 months) that describes some government intervention in the economy with the intent of controlling prices. Identify the parties who benefit and those who are or will be hurt by this intervention. What unintended consequences will likely or have occurred as a result of this intervention. What is your opinion on this matter? Why? Include your thoughts and the link to the article in your post.

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4.16: Assignment- Price Controls After a Storm

In 2014, a major ice storm hit the southeastern U.S. The storm brought down power lines and trees, cutting electricity in many areas, making travel difficult, and slowing down repair crews. Heating homes became a major challenge. The storm created shortages of power generators. As a result, those products sold at prices much higher than normal. These high prices provoked cries of “price gouging” and calls on the government to impose price controls to prevent gouging. While no one likes to pay a higher price than normal for something, consider what would have happened with a price ceiling. The economic intuition is revealing.

Draw a diagram showing the market for generators with an equilibrium price at $250. Now impose a price ceiling at $200 per generator. What would be the impact of the price ceiling on the quantity demanded? On the quantity supplied? Who would benefit from the price ceiling and who would be harmed? Let the graph guide your thinking. Don’t start with your gut reaction! Did the price ceiling help the people it was designed to help? Explain the economic reasoning behind your analysis.

Rubric

Criteria	Not Evident	Developing	Proficient	Distinguished	Weight
Analyze the consequences of the government setting a price ceiling					5
Graphically calculate a market’s equilibrium price and quantity					4
Graphically illustrate a market shortage					4
Calculate the impact of government regulations on price and quantity of a product produced					5
Articulation of response (citations, grammar, spelling, syntax, or organization that negatively impact readability and articulation of main ideas.)					2
				Total:	20

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4.17: Assignment- Problem Set — Applications of Supply and Demand

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- Applications of Supply and Demand Problem Set

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CHAPTER OVERVIEW

5: Elasticity

5.1: Why It Matters- Elasticity
5.2: Assignment- Problem Set — Elasticity
5.3: Introduction to Elasticity
5.4: Elasticity of Demand
5.5: Examples of Elastic and Inelastic Demand
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5.15: Elasticity and Total Revenue
5.16: Elasticity, Costs, and Customers
5.17: Tax Incidence
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5.19: Discussion- Junk Food and Elasticity
5.20: Assignment- Elasticity and Tuition

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5.1: Why It Matters- Elasticity

Why learn about elasticity?

Imagine going to your favorite coffee shop and having the waiter inform you that the pricing has changed. Instead of $3 for a cup of coffee, you will now be charged $2 for coffee, $1 for creamer, and $1 for your choice of sweetener. If you pay your usual $3 for a cup of coffee, you must choose between creamer and sweetener. If you want both, you now face an extra charge of $1. Sound absurd? Well, that's the situation Netflix customers found themselves in—facing a 60 percent price hike to retain the same service.



In early 2011, Netflix consumers paid about $10 a month for a package consisting of streaming video and DVD rentals. In July 2011, the company announced a packaging change. Customers wishing to retain both streaming video and DVD rental would be charged $15.98 per month, a price increase of about 60 percent. How would customers of the fourteen-year-old firm react? Would they abandon Netflix? Would the ease of access to other venues make a difference in how consumers responded to the Netflix price change? In this module, the answers to these questions—about the change in quantity with respect to a change in price—will be explored through a concept economists call *elasticity*.

Elasticity measures the behavioral response of economic agents in a given situation. Here are some examples:

- If a business raises its prices, will that have a large or small impact on demand?
- If you get a pay raise, how much more will you spend on food, clothing or entertainment?
- If hot dogs go on sale at the grocery store, how much additional mustard will consumers purchase?
- If the local Italian restaurant puts their pizza on sale, will the additional number of pizzas sold offset the discount on each item? In other words, will their sales revenues for pizza go up or down?

These are important real-world questions that we'll study in this module.

Also, before we get into the details: it can be easy to get hung up on the math of elasticity calculations. Learning to do these calculations is an important part of applying the elasticity principle, but the math will seem more intuitive if you master concept first: understanding what elasticity means in a particular context will help you see what you're trying to calculate.

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5.3: Introduction to Elasticity

What you'll learn to do: explain the concept of elasticity



Elasticity is an economics concept that measures the responsiveness of one variable to changes in another variable. For example, if you raise the price of your product, how will that affect your sales numbers? The variables in this question are *price* and *sales numbers*. Elasticity explains how much one variable, say sales numbers, will change in response to another variable, like the price of the product.

Mastering this concept resembles learning to ride a bike: it's tough at first, but when you get it, you won't forget. A rookie mistake is learning the calculations of elasticity but failing to grasp the idea. Make sure you don't do this! First take time to understand the concepts—then the calculations can be used simply to explain them in a numerical way.

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5.4: Elasticity of Demand

Learning Objectives

- Describe and give examples of elasticity



Figure 1. Mr. Fantastic is elastic.

Think about the word *elastic*. It suggests that an item can be stretched. In economics, when we talk about **elasticity**, we're referring to how much something will stretch or change in response to another variable. Consider a rubber band, a leather strap, and a steel ring. If you pull on two sides of a rubber band (or Mr. Fantastic), the force will cause it to stretch a lot. If you use the same amount of force to pull on the ends of a leather strap, it will stretch somewhat, but not as much as the rubber band. If you pull on either side of a steel ring, applying the same amount of force, it probably won't stretch at all (unless you're very strong). Each of these materials (the rubber band, the leather strap, and the steel ring) displays a different amount of elasticity in response to being pulled, and all three fall somewhere on a continuum from very stretchy (elastic) to barely stretchy (inelastic).

There are different kinds of economic elasticity—for example, price elasticity of demand, price elasticity of supply, income elasticity of demand, and cross-price elasticity of demand—but the underlying property is always the same: how responsive or sensitive one thing is to a change in another thing.

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Elastic and Inelastic Demand

Let's think about elasticity in the context of price and quantity demanded. While the law of demand does tell us that more of a good will be bought at a lower price, it does not tell us *how much* the quantity demanded will increase because of the price change. For example, if a store owner raises prices, she can expect that the quantity demanded will drop, but she might not know how sensitive customers will be to the change. How many people will buy her products despite the price increase and how many people will be driven away?

If a small change in price creates a large change in the quantity demanded, then we would say that the demand is very **elastic**—that is, the demand is very sensitive to a change in price. If, on the other hand, a large change in price results in a very small change in demand in the quantity demanded, then we would say the demand is **inelastic**. As we will see later, elastic and inelastic are relative concepts. Here's a way to keep this straight: demand is **in**elastic when consumers are **in**sensitive to changes in price.

Consider the example of cigarette taxes and smoking rates—a classic example of inelastic demand. Cigarettes are taxed at both the state and federal level. As you might expect, the greater the amount of the tax increase, the fewer cigarettes are bought and consumed. While the taxes are somewhat of a deterrent, demand doesn't decrease as much as the price increase, though. We can say, then, that the demand for cigarettes is relatively inelastic.

You might think that elasticity isn't an important consideration when it comes to the price of cigarettes. Surely *any* reduction in the demand for cigarettes would be a good thing, right? Does it really matter whether whether the demand is elastic or inelastic? It does. The reason is that taxes on cigarettes serve two purposes: to raise tax revenue for government and to discourage smoking. On

one hand, if a higher cigarette tax discourages consumption by quite a lot—meaning a very large reduction in cigarette sales—then the cigarette tax on each pack will not raise much revenue for the government. On the other hand, a higher cigarette tax that does not discourage consumption by much will actually raise more tax revenue for the government (but not have much impact on smoking rates). Thus, when Congress tries to calculate the effects of altering its cigarette tax, it must analyze *how much* the tax affects the quantity of cigarettes consumed. In other words, understanding the elasticity of cigarette demand is key to measuring the impact of taxes on government revenue AND public health.

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This issue reaches beyond governments and taxes; every firm faces a similar challenge. Every time a firm considers raising the price that it charges, it needs to know how much a price increase will reduce the quantity of its product that is demanded. Conversely, when a firm puts its products on sale, it wants assurance that the lower price will lead to a significantly higher quantity demanded.

Learning Objectives

[glossary-page][glossary-term]elastic demand: [/glossary-term]
[glossary-definition]a high responsiveness of quantity demanded or supplied to changes in price[/glossary-definition][glossary-term]elasticity: [/glossary-term][glossary-definition]an economics concept that measures responsiveness of one variable to changes in another variable[/glossary-definition][glossary-term]inelastic demand: [/glossary-term][glossary-definition]a low responsiveness by consumers to price changes[/glossary-definition][/glossary-page]

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5.5: Examples of Elastic and Inelastic Demand

Learning Objectives

- Analyze why the demand for some goods is either elastic or inelastic



Figure 1. Is coffee elastic or inelastic?

Now that you have a general idea of what elasticity is, let's consider some of the factors that can help us predict whether demand for a product is more or less elastic. The following are important considerations:

- **Substitutes**: Price elasticity of demand is fundamentally about substitutes. If it's easy to find a substitute product when the price of a product increases, the demand will be more elastic. If there are few or no alternatives, demand will be less elastic.
- **Necessities vs. luxuries**: A necessity is something you absolutely must have, almost regardless of the price. A luxury is something that would be nice to have, but it's not absolutely necessary. Consider the elasticity of demand for cookies. A buyer may enjoy a cookie, but it doesn't fulfill a critical need the way a snow shovel after a blizzard or a life-saving drug does. In general, the greater the necessity of the product, the less elastic, or more inelastic, the demand will be, because substitutes are limited. The more luxurious the product is, the more elastic demand will be.
- **Share of the consumer's budget**: If a product takes up a large share of a consumer's budget, even a small percentage increase in price may make it prohibitively expensive to many buyers. Take rental housing that's located close to downtown. Such housing might cost half of one's budget. A small percentage increase in rent could cause renters to relocate to cheaper housing in the suburbs, rather than reduce their spending on food, utilities, and other necessities. Therefore the larger the share of an item in one's budget, the more price elastic demand is likely to be. By contrast, suppose the local grocery store increased the price of toothpicks by 50 percent. Since toothpicks represent such a small part of a consumer's budget, even a significant increase in price is likely to have only a small effect on demand. Thus, the smaller the share of an item in one's budget, the more price inelastic demand is likely to be.
- **Short run versus long run:** Price elasticity of demand is usually lower in the short run, before consumers have much time to react, than in the long run, when they have greater opportunity to find substitute goods. Thus, demand is more price elastic in the long run than in the short run.
- **Competitive dynamics**: Goods that can only be produced by one supplier generally have inelastic demand, while products that exist in a competitive marketplace have elastic demand. This is because a competitive marketplace offers more options for the buyer.

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With these considerations in mind, take a moment to see if you can figure out which of the following products have elastic demand and which have inelastic demand. It may be helpful to remember that when the buyer is **in**sensitive to price, demand is **in**elastic.

- Gasoline
- College textbooks
- Coffee
- Airline tickets
- Concert tickets
- Soft drinks

- Medical procedures

Inelastic Demand	Elastic Demand
Gasoline • The demand for gasoline generally is fairly inelastic, especially in the short run. Car travel requires gasoline. The substitutes for car travel offer less convenience and control. Much car travel is necessary for people to move between activities and can't be reduced to save money. In the long run, though, more options are available, such as purchasing a more fuel-efficient car or choosing a job that is closer to where you work.	**Gas from a Particular Station** • The demand for gasoline from any single gas station, or chain of gas stations, is highly elastic. Buyers can choose between comparable products based on price. There are often many stations in a small geographic area that are equally convenient.
Traditional Textbooks • Generally an instructor assigns a textbook to the student, and the student who wants access to the learning materials must buy it, regardless of the price level. Because the student can't easily identify another textbook or resource that will ensure the same content and grade for the class, he has no substitutes and must buy the book at any price (or opt not to buy it at all).	**New Textbook Distribution Channels** • Increasingly, students have new options to buy the same textbooks from different distribution channels at different price points. These include textbook rentals and digital versions of the text. The introduction of new distribution channels is increasing options for buyers and having an impact on the price elasticity for publishers.
Specialty Coffee Drinks • Many coffee shops have developed branded drinks and specialized experiences in order to reduce substitutes and build customer loyalty. While black coffee is available almost universally, there are few substitutes for a Starbucks Java Chip Frappuccino. Demand for such products is more inelastic.	**Black Coffee** • Coffee is generally widely available at a level of quality that meets the needs of most buyers. The combination of a low price, relative to the buyer's spending power, and the fact that the product is sold by many different suppliers in a competitive market, make the demand highly elastic.
Concert Tickets • Only Taylor Swift can offer a Taylor Swift concert. She holds a monopoly on the creation and delivery of that experience. There is no substitute, and loyal fans are willing to pay for the experience. Because it is a scarce resource and the delivery is tightly controlled by a single provider, access to concerts has inelastic demand.	**Airline Tickets** • Airline tickets are sold in a fiercely competitive market. Buyers can easily compare prices, and buyers experience the services provided by competitors as being very similar. Buyers can often choose not to travel if the cost is too high or substitute travel by car or train.
Medical Procedures • Essential medical procedures have inelastic demand. The patient will pay what she can or what she must. In general, products that significantly affect health and well-being have inelastic demand.	**Soft Drinks** • Soft drinks and many other nonessential items have highly elastic demand. There is competition among every brand and type of soda, and there are many substitutes for the entire category of soft drinks.

Try It

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Learning Objectives

[glossary-page][glossary-term]elastic demand: [/glossary-term]
[glossary-definition]a high responsiveness of quantity demanded or supplied to changes in price[/glossary-definition][glossary-term]inelastic demand: [/glossary-term][glossary-definition]a low responsiveness by consumers to price changes[/glossary-definition][/glossary-page]

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5.6: Introduction to Calculating Price Elasticity

What you'll learn to do: explain the price elasticity of demand and price elasticity of supply, and compute both using the midpoint method



Remember, elasticity measures the responsiveness of one variable to changes in another variable. In the last section we looked at price elasticity of demand, or how much a change in price affects the quantity demanded. In this section we will dig deeper by learning how to calculate elasticity using the midpoint method. We'll also introduce the idea of elasticity of supply. Supply can also be elastic, since a change in price will influence the quantity supplied.

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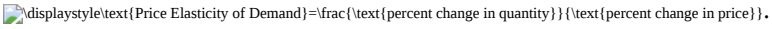
5.7: Calculating Elasticity and Percentage Changes

Learning Objectives

- Mathematically differentiate between elastic, inelastic, and unitary elasticities of demand
- Calculate percentage changes, or growth rates
- Differentiate between the midpoint elasticity approach and the point elasticity approach in calculating elasticity

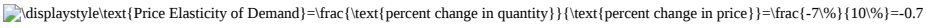
Calculating Elasticity

The formula for calculating elasticity is:



$$\displaystyle\text{Price Elasticity of Demand}=\frac{\text{percent change in quantity}}{\text{percent change in price}}.$$

Let's look at the practical example mentioned earlier about cigarettes. Certain groups of cigarette smokers, such as teenage, minority, low-income, and casual smokers, are somewhat sensitive to changes in price: for every 10 percent increase in the price of a pack of cigarettes, the smoking rates drop about 7 percent. Plugging those numbers into the formula, we get



$$\displaystyle\text{Price Elasticity of Demand}=\frac{\text{percent change in quantity}}{\text{percent change in price}}=\frac{-7\%}{10\%}=-0.7$$

Try It

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Inelastic, Elastic, and Unitary Demand

So what does the number -0.7 tell us about the elasticity of demand? The negative sign reflects the law of demand: at a higher price, the quantity demanded for cigarettes declines. All price elasticities of demand have a negative sign, so it's easiest to think about elasticity in absolute value, ignoring the negative sign. The fact that the result is less than one is more important than the negative sign. It tells us that the size of the quantity change is less than the size of the price change (i.e. the numerator in the elasticity formula is less than the denominator). This tells us that it would take a relatively large price change in order to cause a relatively small change in quantity demanded. In other words, consumer responsiveness to a change in price is relatively small. Therefore, when the elasticity is less than 1, we say that demand is **inelastic**.

The data above indicate that the demand for cigarettes by teenagers, minority, low income and casual smokers is relatively inelastic. Addicted adult smokers, though, are even less sensitive to changes in the price—most are willing to pay whatever it takes to support their smoking habit. We can say that their demand is even more inelastic than low income or casual smokers.

Different products have different price elasticities of demand. If the absolute value of the elasticity of some product is greater than one, it means that the change in the quantity demanded is greater than the change in price. This indicates a larger reaction to price change, which we describe as **elastic**. If the elasticity is equal to one, it means that the change in the quantity demanded is exactly equal to the change in price, so the demand response is exactly proportional to the change in price. We call this **unitary elasticity,** because unitary means one.

Watch It

Watch this video carefully to understand how to solve for elasticity and to see what the numerical values for elasticity mean when applied to economic situations.

A link to an interactive elements can be found at the bottom of this page.

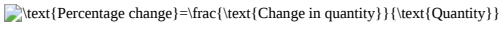
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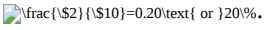
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Calculating Percentage Changes and Growth Rates

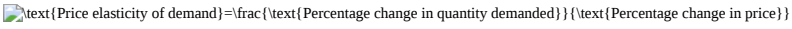
Before we dive deeper into solving for elasticity, let's first make sure we are comfortable calculating percentage changes, also known as a **growthrates**. The formula for computing a growth rate is straightforward:

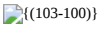


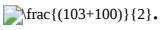
Suppose that a job pays $10 per hour. At some point, the individual doing the job is given a $2-per-hour raise. The percentage change (or growth rate) in pay is



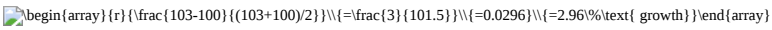
Now to solve for elasticity, we use the growth rate, or percentage change, of the quantity demanded as well as the percentage change in price in order to to examine how these two variables are related. The price elasticity of demand is the ratio between the percentage change in the quantity demanded (Qd) and the corresponding percent change in price:



There are two general methods for calculating elasticities: the **point elasticity approach** and the **midpoint (or arc) elasticity approach**. Elasticity looks at the percentage change in quantity demanded divided by the percentage change in price, but *which* quantity and *which* price should be the denominator in the percentage calculation? The point approach uses the initial price and initial quantity to measure percent change. This makes the math easier, but the more accurate approach is the midpoint approach, which uses the average price and average quantity over the price and quantity change. (These are the price and quantity halfway between the initial point and the final point.) Let's compare the two approaches. Suppose the quantity demanded of a product was 100 at one point on the demand curve, and then it moved to 103 at another point. The growth rate, or percentage change in quantity demanded, would be the change in quantity demanded  divided by the average of the two quantities demanded:



In other words, the growth rate:



Note that if we used the point approach, the calculation would be:



This produces nearly the same result as the slightly more complicated midpoint method (3% vs. 2.96%). If you need a rough approximation, use the point method. If you need accuracy, use the midpoint method. Note: as the two points become closer together, the point elasticity becomes a closer approximation to the arc elasticity.

In this module you will often be asked to calculate the *percentage change* in the quantity. Keep in mind that this is same as the the growth rate of the quantity. As you work through the course and find other applications for calculate growth rates, you will be well prepared.

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Learning Objectives

[glossary-page][glossary-term]elastic demand:[/glossary-term]
[glossary-definition]when the calculated elasticity of demand is greater than one, indicating a high responsiveness of quantity demanded or supplied to changes in price[/glossary-definition]
[glossary-term]elastic supply:[/glossary-term][glossary-definition]when the calculated elasticity of either supply is greater than one, indicating a high responsiveness of quantity demanded or supplied to changes in price [/glossary-definition]
[glossary-term]inelastic demand: [/glossary-term][glossary-definition]when the calculated elasticity of demand is less than one, indicating that a 1 percent increase in price paid by the consumer leads to less than a 1 percent change in purchases (and vice versa); this indicates a low responsiveness by consumers to price changes [/glossary-definition][glossary-term]inelastic supply: [/glossary-term]
[glossary-definition]when the calculated elasticity of supply is less than one, indicating that a 1 percent increase in price paid to the firm will result in a less than 1 percent increase in production by the firm; this indicates a low responsiveness of the firm to price increases (and vice versa if prices drop) [/glossary-definition]
[glossary-term]midpoint elasticity approach: [/glossary-term][glossary-definition]Most accurate approach to solving for elasticity in which the percent changes in quantity demanded and price are measured relative to the average quantity demanded and price; the initial quantity demand is subtracted from the new quantity demanded; then divided by the average of the two quantities demanded; similarly, the initial price is subtracted from the new price, then divided by the average of the two prices [/glossary-definition]
[glossary-term]point elasticity approach: [/glossary-term][glossary-definition]approximate method for solving for elasticity in which the percent changes are measured relative to the initial quantity demanded and price; the initial quantity demanded is subtracted from the new quantity demanded, then divided by the initial quantity demanded; similarly, the initial price is subtracted from the new price, then divided by the initial price. [/glossary-definition]
[glossary-term]unitary elasticity: [/glossary-term][glossary-definition]when the calculated elasticity is equal to one indicating that a change in the price of the good or service results in a proportional change in the quantity demanded or supplied[/glossary-definition][/glossary-page]

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5.8: Calculating Price Elasticities Using the Midpoint Formula

Learning Objectives

- Calculate price elasticity using the midpoint method
- Differentiate between slope and elasticity



Figure 1. Just how elastic is it?

We have defined price elasticity of demand as the responsiveness of the quantity demanded to a change in the price. We also explained that price elasticity is defined as the percent change in quantity demanded divided by the percent change in price. In this section, you will get some practice computing the price elasticity of demand using the midpoint method.

The Midpoint Method

To calculate elasticity, we will use the average percentage change in both quantity and price. This is called the **midpoint method for elasticity** and is represented by the following equations:

$$\displaystyle\text{percent change in quantity}=\frac{Q_2-Q_1}{(Q_2+Q_1)\div{2}}\times{100}$$

$$\displaystyle\text{percent change in price}=\frac{P_2-P_1}{(P_2+P_1)\div{2}}\times{100}$$

The advantage of the midpoint method is that one obtains the same elasticity between two price points whether there is a price increase or decrease. This is because the formula uses the same base for both cases.

Exercise: Calculating the Price Elasticity of Demand

Let’s calculate the elasticity from points B to A and from points G to H, shown in Figure 2, below.

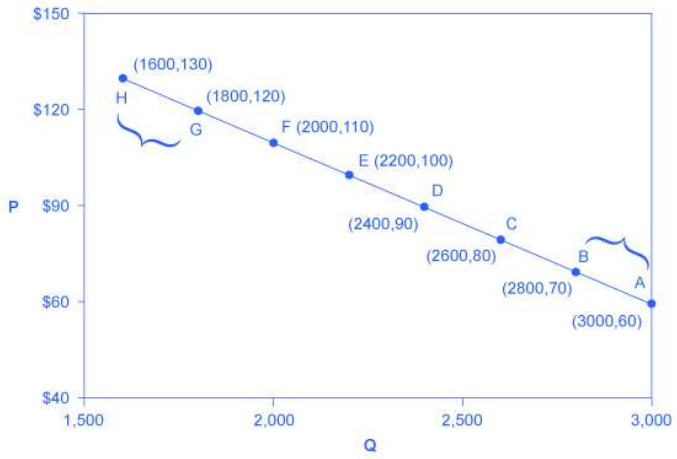


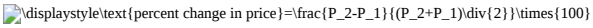
Figure 2.Calculating the Price Elasticity of Demand. The price elasticity of demand is calculated as the percentage change in quantity divided by the percentage change in price.

Elasticity from Point B to Point A

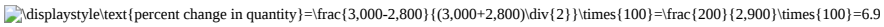
Step 1. We know that $\displaystyle\text{Price Elasticity of Demand}=\frac{\text{percent change in quantity}}{\text{percent change in price}}$

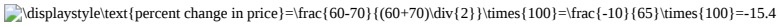
Step 2. From the midpoint formula we know that

$$\displaystyle\text{percent change in quantity}=\frac{Q_2-Q_1}{(Q_2+Q_1)\div{2}}\times{100}$$

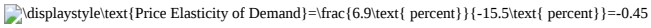


Step 3. We can use the values provided in the figure (as price decreases from $70 at point B to $60 at point A) in each equation:





Step 4. Then, those values can be used to determine the price elasticity of demand:



The elasticity of demand between these two points is 0.45, which is an amount smaller than 1. That means that the demand in this interval is inelastic.

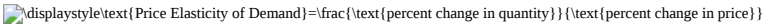
Remember: price elasticities of demand are *always* negative, since price and quantity demanded always move in opposite directions (on the demand curve). As you'll recall, according to the law of demand, price and quantity demanded are inversely related. By convention, we always talk about elasticities as positive numbers, however. So, mathematically, we take the absolute value of the result. For example, -0.45 would interpreted as 0.45.

This means that, along the demand curve between points B and A, if the price changes by 1%, the quantity demanded will change by 0.45%. A change in the price will result in a smaller percentage change in the quantity demanded. For example, a 10% *increase* in the price will result in only a 4.5% *decrease* in quantity demanded. A 10% *decrease* in the price will result in only a 4.5% *increase* in the quantity demanded.

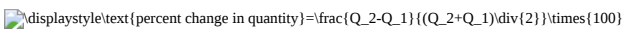
Note also that a larger (negative) number means demand is **more elastic**, so that if price elasticity of demand were -0.75, the quantity demanded would change by a greater percentage than when the elasticity was -0.45.

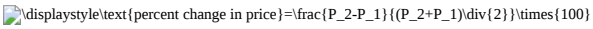
Exercise: Elasticity Of Demand from Point G to Point H

Calculate the price elasticity of demand using the data in Figure 2 for an increase in price from G to H. Does the elasticity increase or decrease as we move up the demand curve?

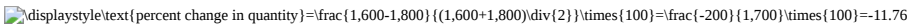
Step 1. We know that 

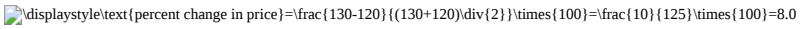
Step 2. From the midpoint formula we know that



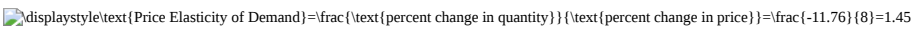


Step 3. We can use the values provided in the figure in each equation:





Step 4. Then, those values can be used to determine the price elasticity of demand:



The elasticity of demand from G to H is 1.47. The magnitude of the elasticity has increased (in absolute value) as we moved up along the demand curve from points A to B. Recall that the elasticity between those two points is 0.45. Demand is inelastic between points A and B and elastic between points G and H. This shows us that price elasticity of demand changes at different points along a *straight-line demand curve*.

Let's pause and think about why the elasticity is different over different parts of the demand curve. When price elasticity of demand is greater (as between points G and H), it means that there is a larger impact on demand as price changes. That is, when the price is higher, buyers are more sensitive to additional price increases. Logically, that makes sense.

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Elasticity Is Not Slope

It's a common mistake to confuse the slope of either the supply or demand curve with its elasticity. The slope is the rate of change in units along the curve, or the rise/run (change in y over the change in x). For example, in Figure 2 above, for each point shown on the demand curve, price drops by $10 and the number of units demanded increases by 200. So the slope is –10/200 along the entire demand curve, and it doesn't change. The price elasticity, however, changes along the curve. Elasticity between points B and A was 0.45 and increased to 1.47 between points G and H. Elasticity is the *percentage* change—which is a different calculation from the slope, and it has a different meaning.

When we are at the upper end of a demand curve, where price is high and the quantity demanded is low, a small change in the quantity demanded—even by, say, one unit—is pretty big in percentage terms. A change in price of, say, a dollar, is going to be much less important in percentage terms than it will be at the bottom of the demand curve. Likewise, at the bottom of the demand curve, that one unit change when the quantity demanded is high will be small as a percentage. So, at one end of the demand curve, where we have a large percentage change in quantity demanded over a small percentage change in price, the elasticity value will be high—demand will be relatively elastic. Even with the same change in the price and the same change in the quantity demanded, at the other end of the demand curve the quantity is much higher, and the price is much lower, so the percentage change in quantity demanded is smaller and the percentage change in price is much higher. See Figure 3, below:

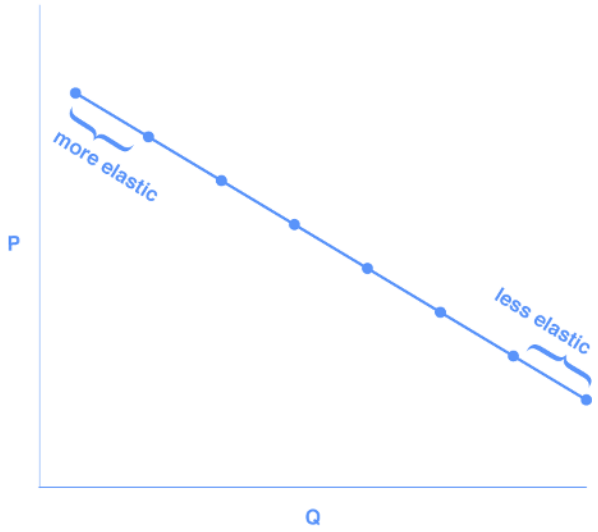


Figure 3. Elasticity changes along the demand curve.

At the bottom of the curve we have a small numerator over a large denominator, so the elasticity measure will be much lower, or inelastic. As we move along the demand curve, the values for quantity and price go up or down, depending on which way we are moving, so the percentages for, say, a $1 difference in price or a one-unit difference in quantity, will change as well, which means the ratios of those percentages will change, too.

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https://assessments.lumenlearning.co...sessments/7156

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[ohm_question]152002-152003-152000[/ohm_question]

Learning Objectives

**[glossary-page][glossary-term]elasticity: [/glossary-term]
[glossary-definition]an economics concept that measures responsiveness of one variable to changes in another variable[/glossary-definition][glossary-term]midpoint method: [/glossary-term][glossary-definition]measures the average elasticity over some part of the demand (or supply) curve[/glossary-definition][glossary-term]more elastic: [/glossary-term][glossary-definition]the calculated elasticity is greater in absolute value, meaning the quantity response is greater to the same change in price[/glossary-definition][/glossary-page]**

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5.9: Learn By Doing- Calculating Price Elasticities

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5.10: Categories of Elasticity

Learning Objectives

- Explain and compare the graphs for the following types of elasticities: elastic, inelastic, unitary, infinite, and zero

The language of elasticity can sometimes be confusing. We use the word elasticity to describe the property of responsiveness in economic variables. We also describe the responsiveness as (relatively) elastic or (relatively) inelastic. It gets worse. We can also describe elasticity as perfectly elastic or perfectly inelastic. How to we keep these different meanings understood? That is the purpose of this section.

We mentioned previously that elasticity measurements are divided into three main ranges: elastic, inelastic, and unitary, corresponding to different parts of a linear demand curve.

Demand is described as **elastic** when the computed elasticity is greater than 1, indicating a high responsiveness to changes in price. Computed elasticities that are less than 1 indicate low responsiveness to price changes and are described as **inelastic** demand. **Unitary elasticities** indicate proportional responsiveness of demand. In other words, the percent change in quantity demanded is equal to the percent change in price, so the elasticity equals 1. These ranges are summarized in Table 1, below.

Table 1. Three Categories of Elasticity: Elastic, Inelastic, and Unitary

If . . .	Then . . .	And It's Called . . .
% change in quantity > % change in price	Computed Elasticity > 1	Elastic
% change in quantity = % change in price	Computed Elasticity = 1	Unitary
% change in quantity < % change in price	Computed Elasticity < 1	Inelastic

It is important to note that both elastic and inelastic are relative terms, as shown in Figure 1, below. As one moves down the demand curve from top left to bottom right, the measured elasticity is much greater than one (very elastic), then just greater than one (somewhat elastic), then equal to one (unitary elastic, then less than one (somewhat inelastic), and finally much less than one (very inelastic). Note that the epsilon symbol, ε, is often used to represent elasticity.

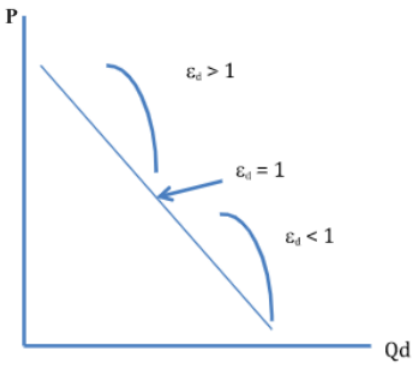


Figure 1. Variations in Elasticity. As you saw earlier, price elasticity of demand ranges from more than 1 at high prices and less than 1 at low prices. Measured elasticities decreases as one moves down the demand curve from left to right.

Polar Cases of Elasticity

There are also two extreme cases of elasticity: when computed elasticity equals zero and when it's infinite. We will describe each case.

A **perfectly** (or **infinitely**) **elastic** demand curve refers to the extreme case in which the quantity demanded (Qd) increases by an infinite amount in response to any decrease in price at all. Similarly, quantity demanded drops to zero for any increase in the price. A perfectly elastic demand curve is horizontal, as shown in Figure 2, below. While it's difficult to think of real world example of infinite elasticity, it will be important when we study perfectly competitive markets. It's a situation where consumers are extremely sensitive to changes in price. Say, for example, if the price of cruises to the Caribbean decreased, everyone would buy tickets (i.e., quantity demanded would increase to infinity), or when the price of cruises to the Caribbean increased, not a single person would be on the boat (i.e., quantity demanded would decrease to zero). Perfectly elastic demand is an "all or nothing" thing!

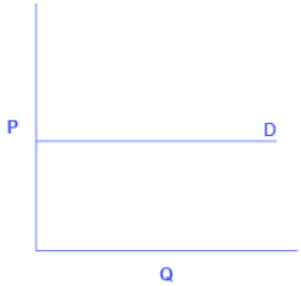


Figure 2. Infinite Elasticity. This shows a perfectly elastic demand curve. The horizontal line shows that an infinite quantity will be demanded at a specific price. The quantity demanded is extremely responsive to price changes, moving from zero for prices close to P to infinite when prices reach P.

While **perfectly inelastic demand** is an extreme case, necessities with no close substitutes are likely to have highly inelastic demand curves. This is the case with life-saving prescription drugs, for example. Consider a person with kidney failure who needs insulin to stay alive. A specific quantity of insulin is prescribed to the patient. If the price of insulin decreases, the patient can't stock up and save it for the future. If the price of insulin increases, the patient will continue to purchase the same quantity needed to stay alive. Perfectly inelastic demand means that quantity demanded remains the same when price increases or decreases. Consumers are completely unresponsive to changes in price.

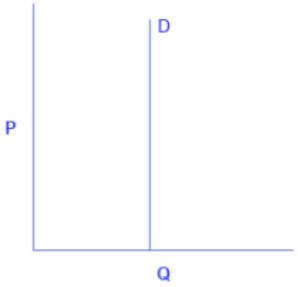


Figure 3. Zero Elasticity. A perfectly inelastic demand curve. The vertical line shows that at any price, the quantity demanded remains the same. The measured elasticity is zero.

Final note: even though perfectly elastic and perfectly inelastic curves correspond to horizontal and vertical curves, remember that, in general, elasticity is not the same as the slope.

Watch It

Watch this video to see graphed examples of perfectly inelastic, relatively inelastic, unit elastic, relatively elastic, and perfectly elastic demand.

A link to an interactive elements can be found at the bottom of this page.

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Learning Objectives

[glossary-page][glossary-term]perfectly (or infinitely) elastic: [/glossary-term][glossary-definition]the extremely elastic situation of demand or supply where quantity changes by an infinite amount in response to any change in price; horizontal in appearance [/glossary-definition][glossary-term]perfectly inelastic: [/glossary-term][glossary-definition]the highly inelastic case of demand in which a percentage change in price, no matter how large, results in zero change in the quantity; thus, the price elasticity of demand is zero; vertical in appearance[/glossary-definition] [glossary-term](relatively) elastic: [/glossary-term][glossary-definition]the percentage change in quantity demanded is greater than the percentage change in price; measured price elasticity of demand is greater than one (in absolute value) [/glossary-definition][glossary-term](relatively) inelastic: [/glossary-term][glossary-definition]the percentage change in quantity demanded is less than the percentage change in price; measure price elasticity of demand is less than one (in absolute value)[/glossary-definition][glossary-term]unitary elastic:[/glossary-term] [glossary-definition]when a given percent price change in price leads to an equal percentage change in quantity demanded[/glossary-definition][/glossary-page]

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5.11: Price Elasticity of Supply

Learning Objectives

- Calculate the price elasticity of supply

Calculating the Price Elasticity of Supply

The price elasticity of supply measures how much quantity supplied changes in response to a change in the price. The calculations and interpretations are analogous to those we explained above for the price elasticity of demand. The only difference is we are looking at how producers respond to a change in the price instead of how consumers respond.

Price elasticity of supply is the percentage change in the quantity of a good or service supplied divided by the percentage change in the price. Since this elasticity is measured along the supply curve, the law of supply holds, and thus price elasticities of supply are always positive numbers. We describe supply elasticities as **elastic**, **unitary elastic** and **inelastic**, depending on whether the measured elasticity is greater than, equal to, or less than one.

Exercise: Elasticity of Supply from Point A to Point B

Assume that an apartment rents for $650 per month and at that price 10,000 units are offered for rent, as shown in Figure 2, below. When the price increases to $700 per month, 13,000 units are offered for rent. By what percentage does apartment supply increase? What is the price sensitivity?

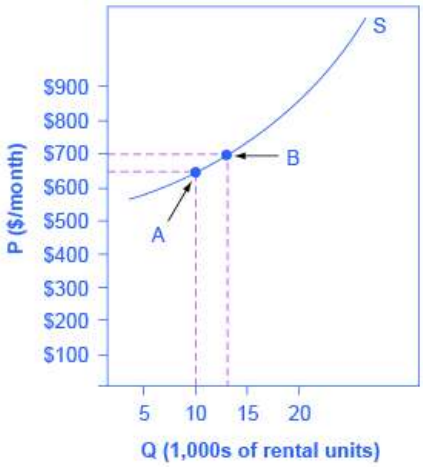
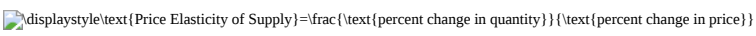


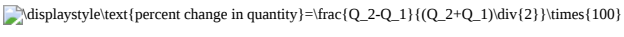
Figure 2. Price Elasticity of Supply. The price elasticity of supply is calculated as the percentage change in quantity divided by the percentage change in price.

Step 1. We know that

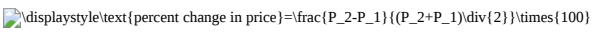


$$\displaystyle\text{Price Elasticity of Supply}=\frac{\text{percent change in quantity}}{\text{percent change in price}}$$

Step 2. From the midpoint method we know that

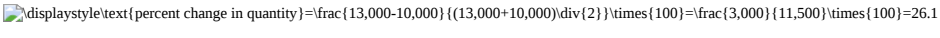


$$\displaystyle\text{percent change in quantity}=\frac{Q_2-Q_1}{(Q_2+Q_1)\div{2}}\times{100}$$

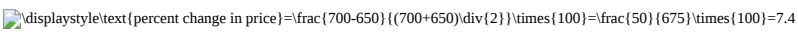


$$\displaystyle\text{percent change in price}=\frac{P_2-P_1}{(P_2+P_1)\div{2}}\times{100}$$

Step 3. We can use the values provided in the figure in each equation:

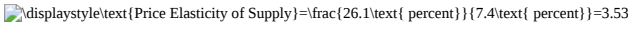


$$\displaystyle\text{percent change in quantity}=\frac{13,000-10,000}{(13,000+10,000)\div{2}}\times{100}=\frac{3,000}{11,500}\times{100}=26.1$$



$$\displaystyle\text{percent change in price}=\frac{700-650}{(700+650)\div{2}}\times{100}=\frac{50}{675}\times{100}=7.4$$

Step 4. Then, those values can be used to determine the price elasticity of demand:



$$\displaystyle\text{Price Elasticity of Supply}=\frac{26.1\text{ percent}}{7.4\text{ percent}}=3.53$$

Again, as with the elasticity of demand, the elasticity of supply is not followed by any units. Elasticity is a ratio of one percentage change to another percentage change—nothing more—and is read as an absolute value. In this case, a 1% rise in price causes an increase in quantity supplied of 3.5%. Since 3.5 is greater than 1, this means that the percentage change in quantity supplied will be greater than a 1% price change. If you're starting to wonder if the concept of slope fits into this calculation, read on for clarification.

Watch It

Watch this video to see a real-world application of price elasticity.

A link to an interactive elements can be found at the bottom of this page.

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[ohm_question]152038-152039-152040-152041-152131[/ohm_question]

Learning Objectives

[glossary-page][glossary-term]elastic supply: [/glossary-term]
[glossary-definition]supply responds more than proportionately to a change in price; i.e. the percent change in quantity supplied is greater than percent change in price [/glossary-definition][glossary-term]inelastic supply:[/glossary-term][glossary-definition] supply responds less than proportionately to a change in price; i.e. the percent change in quantity supplied is less than percent change in price[/glossary-definition][glossary-term]price elasticity of supply: [/glossary-term]
[glossary-definition]percentage change in the quantity supplied divided by the percentage change in price[/glossary-definition]
[glossary-term]unitary elastic supply: [/glossary-term][glossary-definition]supply responds exactly proportionately to a change in price; i.e. the percent change in quantity supplied is equal to the percent change in price[/glossary-definition][/glossary-page]

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5.12: Introduction to Elasticities in Areas Other Than Price

What you'll learn to do: explain and calculate other elasticities using common economic variables



Remember, elasticity measures the responsiveness of one variable to changes in another variable. We have focused on how a change in price can impact other variables. Elasticity doesn't apply only to price, however. It can describe anything that affects demand or supply. For example, when consumer income varies, it can have an impact on demand. When we consider that impact, we are measuring the responsiveness of one variable (demand) to changes in another variable (consumer income). This is called the income elasticity of demand.

Likewise, if two goods are complements or substitutes, a change in demand for one can have an impact on the demand for the other. This is known as cross-price elasticity of demand. In this section, we'll elaborate on the idea of elasticity to see how it applies to other economic variables.

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5.13: Income Elasticity, Cross-Price Elasticity and Other Types of Elasticities

Learning Objectives

- Calculate the income elasticity of demand
- Explain and calculate cross-price elasticity of demand
- Describe elasticity in labor and financial capital markets



Figure 1. S'more ingredients: negative or positive cross-price elasticities of demand?

The basic idea of elasticity—how a percentage change in one variable causes a percentage change in another variable—does not just apply to the responsiveness of supply and demand to changes in the price of a product. Recall that quantity demanded (Qd) depends on income, tastes and preferences, population, expectations about future prices, and the prices of related goods. Similarly, quantity supplied (Qs) depends on the cost of production, changes in weather (and natural conditions), new technologies, and government policies. Elasticity can, in principle, be measured for any determinant of supply and demand, not just the price.

Income Elasticity of Demand

The **income elasticity of demand** is the percentage change in quantity demanded divided by the percentage change in income, as follows:

$$\text{income elasticity of demand}=\frac{\text{percent change in quantity demanded}}{\text{percent change in income}}$$

For most products, most of the time, the income elasticity of demand is positive: that is, a rise in income will cause an increase in the quantity demanded. This pattern is common enough that these goods are referred to as **normal goods**. However, for a few goods, an increase in income means that one might purchase less of the good; for example, those with a higher income might buy fewer hamburgers, because they are buying more steak instead, or those with a higher income might buy less cheap wine and more imported beer. When the income elasticity of demand is negative, the good is called an **inferior good**. The concepts of normal and inferior goods were introduced in the Supply and Demand module. A higher level of income for a normal good causes a demand curve to shift to the right for a normal good, which means that the income elasticity of demand is positive. How far the demand shifts depends on the income elasticity of demand. A higher income elasticity means a larger shift. However, for an inferior good—that is, when the income elasticity of demand is negative—a higher level of income would cause the demand curve for that good to shift to the left. Again, how much it shifts depends on how large the (negative) income elasticity is.

Watch It

Watch this video for an applied example of calculating the income elasticity of demand.

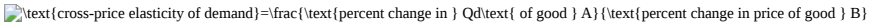
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Cross-Price Elasticity of Demand

A change in the price of one good can shift the quantity demanded for another good. If the two goods are complements, like bread and peanut butter, then a drop in the price of one good will lead to an increase in the quantity demanded of the other good. However, if the two goods are substitutes, like plane tickets and train tickets, then a drop in the price of one good will cause people to substitute toward that good, and to reduce consumption of the other good. Cheaper plane tickets lead to fewer train tickets, and vice versa. The **cross-price elasticity of demand** puts some meat on the bones of these ideas. The term "cross-price" refers to the idea that the price of one good is affecting the quantity demanded of a different good. Specifically, the cross-price elasticity of demand is the percentage change in the quantity of good A that is demanded as a result of a percentage change in the price of good B, as follows:

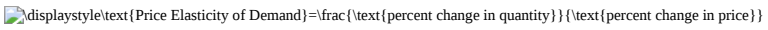


Substitute goods have positive cross-price elasticities of demand: if good A is a substitute for good B, like coffee and tea, then a higher price for B will mean a greater quantity of A consumed. Complement goods have negative cross-price elasticities: if good A is a complement for good B, like coffee and sugar, then a higher price for B will mean a lower quantity of A consumed.

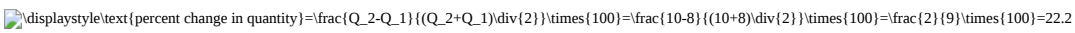
Exercise: Calculating Cross-Price Elasticity of Demand

Let's practice calculating cross-price elasticity of demand by looking at two goods: widgits and sprockets. The initial price and quantity of widgets demanded is (P_1 = 12, Q_1 = 8). The subsequent price and quantity is (P_2 = 9, Q_2 = 10). This is all the information needed to compute the price elasticity of demand.

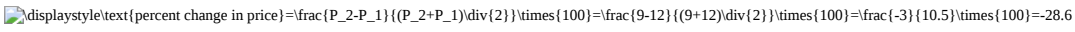
The price elasticity of demand is defined as follows:



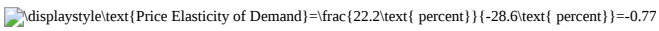
From the midpoint formula, we know that:



And:

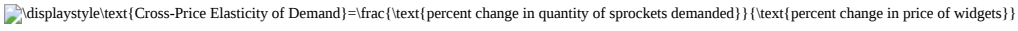


Therefore:



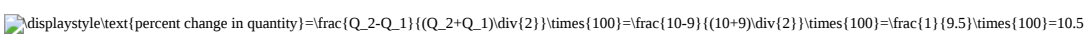
Since the elasticity is less than 1 (in absolute value), we can say that the price elasticity of demand for widgets is in the inelastic range.

The cross-price elasticity of demand is computed similarly:



The initial quantity of sprockets demanded is 9 and the subsequent quantity demanded is 10 (Q1 = 9, Q2 = 10).

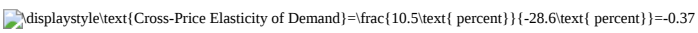
Using the midpoint formula, we can calculate the percent change in the quantity of sprockets demanded:



The percent change in the quantity of sprockets demanded is 10.5%.

The percent change in the price of widgets is the same as above, or -28.6%.

Therefore:



Because the cross-price elasticity is negative, we can conclude that widgets and sprockets are complementary goods. Intuitively, when the price of widgets goes down, consumers purchase more widgets. Because they're purchasing more widgets, they purchase more sprockets.

Watch It

Watch this video to see an example of solving for the cross-price elasticity of demand.

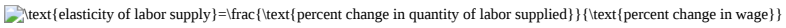
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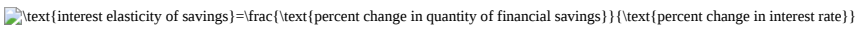
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Elasticity in Labor and Financial Capital Markets

The concept of elasticity applies to any market, not just markets for goods and services. In the labor market, for example, the **wage elasticity of labor supply**—that is, the percentage change in hours worked divided by the percentage change in wages—will determine the shape of the labor supply curve. The formula is as follows:



The wage elasticity of labor supply for teenage workers is generally thought to be fairly elastic: that is, a certain percentage change in wages will lead to a larger percentage change in the quantity of hours worked. Conversely, the wage elasticity of labor supply for adult workers in their thirties and forties is thought to be fairly inelastic. When wages move up or down by a certain percentage amount, the quantity of hours that adults in their prime earning years are willing to supply changes but by a lesser percentage amount. In markets for financial capital, the **interest elasticity of savings**—that is, the percentage change in the quantity of savings divided by the percentage change in interest rates—will describe the shape of the supply curve for financial capital, as follows:



Sometimes laws are proposed that seek to increase the quantity of savings by offering tax breaks so that the return on savings is higher. Such a policy will increase the quantity if the supply curve for financial capital is elastic, because then a given percentage increase in the return to savings will cause a higher percentage increase in the quantity of savings. However, if the supply curve for financial capital is highly inelastic, then a percentage increase in the return to savings will cause only a small increase in the quantity of savings. The evidence on the supply curve of financial capital is controversial but, at least in the short run, the elasticity of savings with respect to the interest rate appears fairly inelastic.

Expanding the Concept of Elasticity

The elasticity concept does not even need to relate to a typical supply or demand curve at all. For example, imagine that you are studying whether the Internal Revenue Service should spend more money on auditing tax returns. The question can be framed in terms of the elasticity of tax collections with respect to spending on tax enforcement; that is, what is the percentage change in tax collections derived from a percentage change in spending on tax enforcement? With all of the elasticity concepts that have just been described, some of which are listed in Table 1, the possibility of confusion arises. When you hear the phrases "elasticity of demand" or "elasticity of supply," they refer to the elasticity with respect to price. Sometimes, either to be extremely clear or because a wide variety of elasticities is being discussed, the elasticity of demand or the demand elasticity will be called the price elasticity of demand or the "elasticity of demand with respect to price." Similarly, elasticity of supply or the supply elasticity is sometimes called, to avoid any possibility of confusion, the price elasticity of supply or "the elasticity of supply with respect to

price.” But in whatever context elasticity is invoked, the idea always refers to percentage change in one variable, almost always a price or money variable, and how it causes a percentage change in another variable, typically a quantity variable of some kind.

Table 1. Formulas for Calculating Elasticity

Elasticity Type	Formula
Income elasticity of demand	=%change in Qd / % change in income
Cross-price elasticity of demand	=% change in Qd of good A / % change in price of good B
Wage elasticity of labor supply	=% change in quantity of labor supplied / % change in wage
Wage elasticity of labor demand	=% change in quantity of labor demanded / % change in wage
Interest rate elasticity of savings	=% change in quantity of savings / % change in interest rate
Interest rate elasticity of borrowing	=% change in quantity of borrowing / % change in interest rate

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[ohm_question]152044-152046-152132-152045[/ohm_question]

Glossary

[glossary-page][glossary-term]cross-price elasticity of demand: [/glossary-term][glossary-definition]the percentage change in the quantity of good A that is demanded as a result of a percentage change in good B[/glossary-definition][glossary-term]interest elasticity of savings: [/glossary-term][glossary-definition]the percentage change in the quantity of savings divided by the percentage change in interest rates[/glossary-definition][glossary-term]wage elasticity of labor supply: [/glossary-term][glossary-definition]the percentage change in hours worked divided by the percentage change in wages[/glossary-definition][/glossary-page]

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5.14: Introduction to Price Elasticity and Total Revenue

What you'll learn to do: explain the relationship between a firm's price elasticity of demand and total revenue



Price elasticity of demand describes how changes in the price for goods and the demand for those same goods relate. As those two variables interact, they can have an impact on a firm's total revenue. Revenue is the amount of money a firm brings in from sales—i.e., the total number of units sold multiplied by the price per unit. Therefore, as the price or the quantity sold changes, those changes have a direct impact on revenue.

Businesses seek to maximize their profits, and price is one tool they have at their disposal to influence demand (and therefore sales). Picking the right price is tricky, though. What happens with a price increase? Will customers buy only a little less, such that the price increase raises revenues, or will they buy a lot less, such that the price increase lowers revenues? Might the company earn more if it lowers prices, or will that just lead to lower revenue per unit without stimulating new demand? These are critical questions for every business.

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5.15: Elasticity and Total Revenue

Learning Objectives

- Explain how differences in elasticity affect total revenue

Total Revenue and Elasticity of Demand

Studying elasticities is useful for a number of reasons, pricing being the most important. Imagine that a band on tour is playing in an indoor arena with 15,000 seats. To keep this example simple, assume that the band keeps all the money from ticket sales. Assume further that the band pays the costs for its appearance, but that these costs, like travel, setting up the stage, and so on, are the same regardless of how many people are in the audience. Finally, assume that all the tickets have the same price. (The same insights apply if ticket prices are more expensive for some seats than for others, but the calculations become more complicated.) The band knows that it faces a downward-sloping demand curve; that is, if the band raises the price of tickets, it will sell fewer tickets. How should the band set the price for tickets to bring in the most total revenue, which in this example, because costs are fixed, will also mean the highest profits for the band? Should the band sell more tickets at a lower price or fewer tickets at a higher price?

The key concept in thinking about collecting the most revenue is the price elasticity of demand. **Total revenue** is price times the quantity of tickets sold (TR = P x Qd). Imagine that the band starts off thinking about a certain price, which will result in the sale of a certain quantity of tickets. The three possibilities are laid out in Table 1. If demand is elastic at that price level, then the band should cut the price, because the percentage drop in price will result in an even larger percentage increase in the quantity sold—thus raising total revenue. However, if demand is inelastic at that original quantity level, then the band should raise the price of tickets, because a certain percentage increase in price will result in a smaller percentage decrease in the quantity sold—and total revenue will rise. If demand has a unitary elasticity at that quantity, then a moderate percentage change in the price will be offset by an equal percentage change in quantity—so the band will earn the same revenue whether it (moderately) increases or decreases the price of tickets.

Table 1. Price Elasticity of Demand

If demand is . . .	Then . . .	Therefore . . .
Elastic	% change in Qd is greater than % change in P	• A given % rise in P will be more than offset by a larger % fall in Q so that total revenue (P times Q) falls. • A given % fall in P will be more than offset by a larger rise in Q so that total revenue (P times Q) rises.
Unitary	% change in Qd is equal to % change in P	• A given % rise or fall in P will be exactly offset by an equal % fall in Q so that total revenue (P times Q) is unchanged.
Inelastic	% change in Qd is less than % change in P	• A given % rise in P will cause a smaller % fall in Q so that total revenue (P times Q) rises. • A given % fall in P will cause a smaller % rise in Q so that total revenue (P times Q) falls.

If demand is elastic at a given price level, then should a company cut its price, the percentage drop in price will result in an even larger percentage increase in the quantity sold—thus raising total revenue. However, if demand is inelastic at the original quantity level, then should the company raise its prices, the percentage increase in price will result in a smaller percentage decrease in the quantity sold—and total revenue will rise.

Let’s explore some specific examples. In both cases we will answer the following questions:

1. How much of an impact do we think a price change will have on demand?

2. How would we calculate the elasticity, and does it confirm our assumption?
3. What impact does the elasticity have on total revenue?

Example 1: The Student Parking Permit



Figure 1. Parking is often a hot commodity on campus.

How elastic is the demand for student parking passes at your institution?

The answer to that question likely varies based on the profile of your institution, but we are going to explore a particular example. Let's consider a community college campus where all of the students commute to class. Required courses are spread throughout the day and the evening, and most of the classes require classroom attendance (rather than online participation). There is a reasonable public transportation system with busses coming to and leaving campus from several lines, but the majority of students drive to campus. A student parking permit costs $40 per term. As the parking lots become increasingly congested, the college considers raising the price of the parking passes in hopes that it will encourage more students to carpool or to take the bus.

If the college increases the price of a parking permit from $40 to $48, how many fewer students will buy parking permits?

If you think that the change in price will cause many students to decide not to buy a permit, then you are suggesting that the demand is elastic—the students are quite sensitive to price changes. If you think that the change in price will not impact student permit purchases much, then you are suggesting that the demand is inelastic—student demand for permits is insensitive to price changes.

In this case, we can all argue that students are very sensitive to increases in costs *in general*, but the determining factor in their demand for parking permits is more likely to be the quality of alternative solutions. If the bus service does not allow students to travel between home, school, and work in a reasonable amount of time, many students will resort to buying a parking permit, even at the higher price. Because students don't generally have extra money, they may grumble about a price increase, but many will still have to pay.

Let's add some numbers and test our thinking. The college implements the proposed increase of $8, taking the new price to $48. Last year the college sold 12,800 student parking passes. This year, at the new price, the college sells 11,520 parking passes.

$$\displaystyle\text{percent change in quantity}=\frac{11,520-12,800}{(11,520+12,800)\div{2}}\times{100}=\frac{-1280}{12160}\times{100}=-10.53$$

$$\displaystyle\text{percent change in price}=\frac{48-40}{(48+40)\div{2}}\times{100}=\frac{8}{44}\times{100}=18.18$$

$$\displaystyle\text{Price Elasticity of Demand}=\frac{-10.53\text{ percent}}{18.18\text{ percent}}=-.58$$

First, looking only at the percent change in quantity and the percent change in price we know that an 18% change in price will resulted in an 11% change in demand. In other words, a large change in price created a comparatively smaller change in demand. We can also see that the elasticity is 0.58. When the absolute value of the price elasticity is < 1, the demand is inelastic. In this example, student demand for parking permits is inelastic.

What impact does the price change have on the college and their goals for students? First, there are 1,280 fewer cars taking up parking places. If all of those students are using alternative transportation to get to school and this change has relieved parking-capacity issues, then the college may have achieved its goals. However, there's more to the story: the price change also has an effect on the college's revenue, as we can see below:

Year 1: 12,800 parking permits sold x $40 per permit = $512,000

Year 2: 11,520 parking permits sold x $48 per permit = $552,960

The college earned an additional $40,960 in revenue. Perhaps this can be used to expand parking or address other student transportation issues.

In this case, student demand for parking permits is inelastic. A significant change in price leads to a comparatively smaller change in demand. The result is lower sales of parking passes but more revenue.

Note: If you attend an institution that offers courses completely or largely online, the price elasticity for parking permits might be perfectly inelastic. Even if the institution gave away parking permits, students might not want them.

Example 2: Helen's Cookies

Have you been at the counter of a convenience store and seen



Figure 2. Would a small raise in price deter you from a cookie?

cookies for sale on the counter? In this example we are going to consider a baker, Helen, who bakes these cookies and sells them for $2 each. The cookies are sold in a convenience store, which has several options on the counter that customers can choose as a last-minute impulse buy. All of the impulse items range between $1 and $2 in price. In order to raise revenue, Helen decides to raise her price to $2.20.

If Helen increases the cookie price from $2.00 to $2.20—a 10% increase—will fewer customers buy cookies?

If you think that the change in price will cause many buyers to forego a cookie, then you are suggesting that the demand is elastic, or that the buyers are sensitive to price changes. If you think that the change in price will not impact sales much, then you are suggesting that the demand for cookies is inelastic, or insensitive to price changes.

Let's assume that this price change does impact customer behavior. Many customers choose a $1 chocolate bar or a $1.50 doughnut over the cookie, or they simply resist the temptation of the cookie at the higher price. Before we do any math, this assumption suggests that the demand for cookies is elastic.

Adding in the numbers, we find that Helen's weekly sales drop from 200 cookies to 150 cookies. This is a 25% change in demand on account of a 10% price increase. We immediately see that the change in demand is greater than the change in price. That means that demand is elastic. Let's do the math.

$$\displaystyle\text{percent change in quantity}=\frac{150-200}{(150+200)\div{2}}\times{100}=\frac{-50}{175}\times{100}=-28.75$$

$$\displaystyle\text{percent change in price}=\frac{2.20-2.00}{(2.00+2.20)\div{2}}\times{100}=\frac{.20}{2.10}\times{100}=9.52$$

$$\displaystyle\text{Price Elasticity of Demand}=\frac{-28.75\text{ percent}}{9.52\text{ percent}}=-3$$

When the absolute value of the price elasticity is > 1, the demand is elastic. In this example, the demand for cookies is elastic.

What impact does this have on Helen's objective to increase revenue? It's not pretty.

Price 1: 200 cookies sold x $2.00 per cookie = $400

Price 2: 150 cookies sold x $2.20 = $330

She is earning less revenue because of the price change. What should Helen do next? She has learned that a small change in price leads to a large change in demand. What if she lowered the price slightly from her original $2.00 price? If the pattern holds, then a small reduction in price will lead to a large increase in sales. That would give her a much more favorable result.

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Learning Objectives

[glossary-page][glossary-term]Total revenue: [/glossary-term]
[glossary-definition]the price of an item multiplied by the number of units sold: TR = P x Qd [/glossary-definition][/glossary-page]

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5.16: Elasticity, Costs, and Customers

Learning Objectives

- Evaluate how elasticity can cause shifts in demand and supply
- Predict how elasticity affects equilibrium in the long-run and the short-run

Customers and Changing Costs

We can see that understanding elasticity helps a firm set a price that maximizes total revenue. What happens if the firm's production costs change, though? And what is the impact on customers?

Most businesses are continually trying to figure out ways to produce at a lower cost, as one path to earning higher profits. It's a challenge to do this, though, when the price of a key input over which a firm has no control rises. For example, many chemical companies use petroleum as a key input, but they have no control over the world market price for crude oil. Coffee shops use coffee as a key input, but they have no control over the world market price of coffee. If the cost of a key input rises, can the firm pass along those higher costs to consumers in the form of higher prices?

Conversely, if new and less expensive ways of producing are invented, can the firm keep the benefits in the form of higher profits, or will the market pressure them to pass along the gains to consumers in the form of lower prices? The price elasticity of demand plays a key role in answering these questions.



Figure 1. Pills and Production. Consider how a technological breakthrough in aspirin production would impact the market if it were inelastic and if it were elastic.

Imagine that, as a consumer of legal pharmaceutical products, you read a news story about a technological breakthrough in the production of aspirin: now every aspirin factory can make aspirin more cheaply than it did before.

What does this discovery mean to you? Figure 2 illustrates two possibilities. In Figure 2(a), the demand curve is highly inelastic. In this case, a technological breakthrough that shifts supply to the right, from S_0 to S_1, so that the equilibrium shifts from E_0 to E_1, creates a substantially lower price for the product with relatively little impact on the quantity sold. In Figure 2(b), the demand curve is highly elastic. In this case, the technological breakthrough leads to a much greater quantity sold in the market at very close to the original price. Consumers benefit more, in general, when the demand curve is more inelastic because the shift in the supply results in a much lower price for consumers.

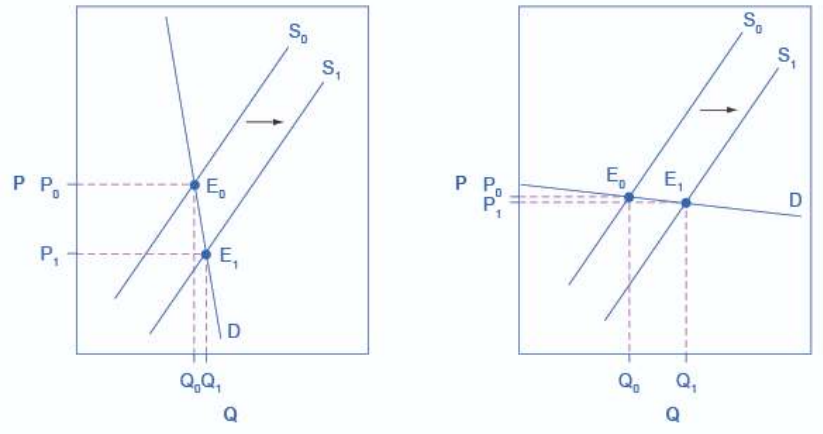


Figure 2.Passing along Cost Savings to Consumers. Cost-saving gains cause supply to shift out to the right from S_0 to S_1; that is, at any given price, firms will be willing to supply a greater quantity. If demand is inelastic, as in (a), the result of this cost-saving technological improvement will be substantially lower prices. If demand is elastic, as in (b), the result will be only slightly lower prices. Consumers benefit in either case, from a greater quantity at a lower price, but the benefit is greater when demand is inelastic, as in (a).

Producers of aspirin may find themselves in a nasty bind here. The situation shown in Figure 2, with extremely inelastic demand, means that a new invention may cause the price to drop dramatically while quantity changes little. As a result, the new production technology can lead to a drop in the revenue that firms earn from sales of aspirin. However, if strong competition exists between producers of aspirin, each producer may have little choice but to search for and implement any breakthrough that allows it to reduce production costs.

After all, if one firm decides not to implement such a cost-saving technology, it can be driven out of business by other firms that do.

Since demand for food is generally inelastic, farmers may often face the situation in Figure 2(a). That is, a surge in production leads to a severe drop in price that can actually decrease the total revenue received by farmers. Conversely, poor weather or other conditions that cause a terrible year for farm production can sharply raise prices so that the total revenue received increases. The example below discusses how these issues relate to coffee.

Fluctuations in Coffee Prices

Coffee is an international crop. The top five coffee-exporting nations are Brazil, Vietnam, Colombia, Indonesia, and Guatemala. In these nations and others, 20 million families depend on selling coffee beans as their main source of income. These families are exposed to enormous risk, because the world price of coffee bounces up and down. For example, in 1993, the world price of coffee was about 50 cents per pound; in 1995 it was four times as high, at $2 per pound. By 1997 it had fallen by half to $1.00 per pound. In 1998 it leaped back up to $2 per pound. By 2001 it had fallen back to 46 cents a pound; by early 2011 it went back up to about $2.31 per pound. By the end of 2012, the price had fallen back to about $1.31 per pound.

The reason for these price fluctuations stems from a combination of inelastic demand and shifts in supply. The elasticity of coffee demand is only about 0.3; that is, a 10% rise in the price of coffee leads to a decline of about 3% in the quantity of coffee consumed. When a major frost hit the Brazilian coffee crop in 1994, coffee supply shifted to the left with an inelastic demand curve, leading to much higher prices. Conversely, when Vietnam entered the world coffee market as a major producer in the late 1990s, the supply curve shifted out to the right. With a highly inelastic demand curve, coffee prices fell dramatically. This situation is shown in Figure 2 (a), above.

Watch It

Get some more practice applying elasticity in the real world by watching the following video about what happens to the housing rental market (and the prices you would pay for rent) depending on whether or not demand is elastic or inelastic.

A link to an interactive elements can be found at the bottom of this page.

Elasticity also reveals whether firms can pass higher costs that they incur on to consumers. Addictive substances, for which demand is inelastic, are products for which producers can pass higher costs on to consumers. For example, the demand for cigarettes is relatively inelastic among regular smokers who are somewhat addicted. Economic research suggests that increasing cigarette prices by 10% leads to about a 3% reduction in the quantity of cigarettes that adults smoke, so the elasticity of demand for cigarettes is 0.3. If society increases taxes on companies that produce cigarettes, the result will be, as in Figure 3(a), that the supply curve shifts from S_0 to S_1. However, as the equilibrium moves from E_0 to E_1, producers mainly pass along these taxes to consumers in the form of higher prices. These higher taxes on cigarettes will raise tax revenue for the government, but they will not much affect the quantity of smoking.

If the goal is to reduce the quantity of cigarettes demanded, we must achieve it by shifting this inelastic demand back to the left, perhaps with public programs to discourage cigarette use or to help people to quit. For example, anti-smoking advertising campaigns have shown some ability to reduce smoking. However, if cigarette demand were more elastic, as in Figure 3 (b), then an increase in taxes that shifts supply from S_0 to S_1 and equilibrium from E_0 to E_1 would reduce the quantity of cigarettes smoked substantially. Youth smoking seems to be more elastic than adult smoking—that is, the quantity of youth smoking will fall by a greater percentage than the quantity of adult smoking in response to a given percentage increase in price.

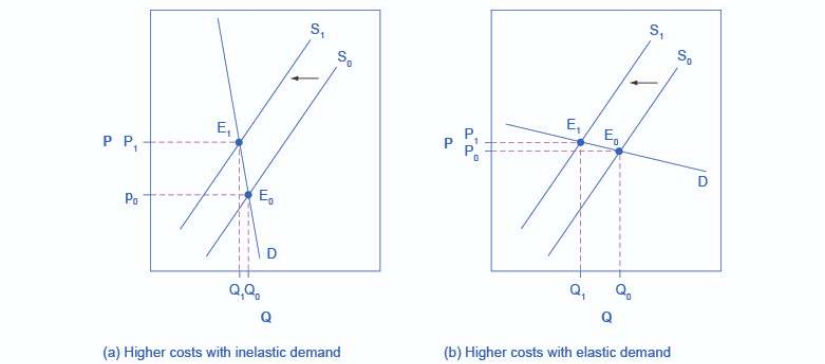


Figure 3.Passing along Higher Costs to Consumers. Higher costs, like a higher tax on cigarette companies for the example given in the text, lead supply to shift to the left. This shift is identical in (a) and (b). However, in (a), where demand is inelastic, the cost increase can largely be passed along to consumers in the form of higher prices, without much of a decline in equilibrium quantity. In (b), demand is elastic, so the shift in supply results primarily in a lower equilibrium quantity. Consumers suffer in either case, but in (a), they suffer from paying a higher price for the same quantity, while in (b), they suffer from buying a lower quantity (and presumably needing to shift their consumption elsewhere).

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Long-Run vs. Short-Run Impact

Elasticities are often lower in the short run than in the long run. On the demand side of the market, it can sometimes be difficult to change Qd in the short run but easier in the long run. Consumption of energy is a clear example. In the short run, it is not easy for a person to make substantial changes in his or her energy consumption. Maybe you can carpool to work sometimes or adjust your home thermostat by a few degrees if the cost of energy rises, but that's about it. However, in the long-run you can purchase a car that gets more miles to the gallon, choose a job that is closer to where you live, buy more energy-efficient home appliances, or install more insulation in your home.

As a result, the elasticity of demand for energy is somewhat inelastic in the short run, but much more elastic in the long run. Figure 4 shows an example, based roughly on historical experience, of the responsiveness of Qd to price changes. In 1973, the price of crude oil was $12 per barrel, and total consumption in the U.S. economy was 17 million barrels per day. That year, the nations who were members of the Organization of Petroleum Exporting Countries (OPEC) cut off oil exports to the United States for six months because the Arab members of OPEC disagreed with the U.S. support for Israel. OPEC did not bring exports back to their earlier levels until 1975—a policy that can be interpreted as a shift of the supply curve to the left in the U.S. petroleum market. Figure 4(a) and (b) show the same original equilibrium point and the same identical shift of a supply curve to the left from S_0 to S_1.

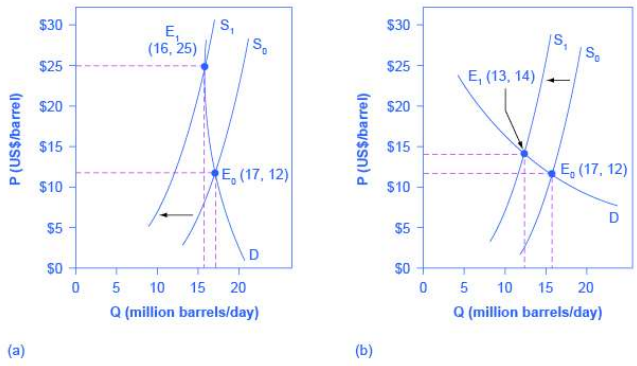


Figure 4.How a Shift in Supply Can Affect Price or Quantity. The intersection (E_0) between demand curve D and supply curve S_0 is the same in both (a) and (b). The shift of supply to the left from S_0 to S_1 is identical in both (a) and (b). The new equilibrium (E_1) has a higher price and a lower quantity than the original equilibrium (E_0) in both (a) and (b). However, the shape of the demand curve D is different in (a) and (b). As a result, the shift in supply can result either in a new equilibrium with a much higher price and an only slightly smaller quantity, as in (a), or in a new equilibrium with only a small increase in price and a relatively larger reduction in quantity, as in (b).

Figure 4(a) shows inelastic demand for oil in the short run similar to that which existed for the United States in 1973. In Figure 4(a), the new equilibrium (E_1) occurs at a price of $25 per barrel, roughly double the price before the OPEC shock, and an equilibrium quantity of 16 million barrels per day. Figure 3(b) shows what the outcome would have been if the U.S. demand for oil had been more elastic, a result more likely over

the long term. This alternative equilibrium (E1) would have resulted in a smaller price increase to $14 per barrel and larger reduction in equilibrium quantity to 13 million barrels per day. In 1983, for example, U.S. petroleum consumption was 15.3 million barrels a day, which was lower than in 1973 or 1975. U.S. petroleum consumption was down even though the U.S. economy was about one-fourth larger in 1983 than it had been in 1973. The primary reason for the lower quantity was that higher energy prices spurred conservation efforts, and after a decade of home insulation, more fuel-efficient cars, more efficient appliances and machinery, and other fuel-conserving choices, the demand curve for energy had become more elastic.

On the supply side of markets, producers of goods and services typically find it easier to expand production in the long term of several years rather than in the short run of a few months. After all, in the short run it can be costly or difficult to build a new factory, hire many new workers, or open new stores. But over a few years, all of these are possible.

Indeed, in most markets for goods and services, prices bounce up and down more than quantities in the short run, but quantities often move more than prices in the long run. The underlying reason for this pattern is that supply and demand are often inelastic in the short run, so that shifts in either demand or supply can cause a relatively greater change in prices. But since supply and demand are more elastic in the long run, the long-run movements in prices are more muted, while quantity adjusts more easily in the long run.

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5.17: Tax Incidence

Learning Objectives

- Explain how the price elasticities of demand and supply determine the incidence of a tax on buyers and sellers

Elasticity and Tax Incidence

People often assume that when government imposes a tax on purchases of some product, producers simply raise the price of the product so that consumers end up paying the tax. Makes sense, right? Except like many economic myths, it's not true. The analysis, or manner, of how a tax burden is divided between consumers and producers is called **tax incidence**. Tax incidence depends on the price elasticities of supply and demand.

The example of cigarette taxes introduced previously demonstrated that because demand is inelastic, taxes are not effective at reducing the equilibrium quantity of smoking, and they mainly pass along to consumers in the form of higher prices. With other products, however, the burden of the tax can be very different. Let's drill down into these ideas.

Watch It

A link to an interactive elements can be found at the bottom of this page.

Typically, the tax incidence, or burden, falls both on the consumers and producers of the taxed good. However, if one wants to predict which group will bear most of the burden, all one needs to do is examine the elasticity of demand and supply. In the tobacco example, the tax burden falls on the most inelastic side of the market.

Note also, that when taxes on sales affect the equilibrium quantity, there are effects on economic welfare. You can see that as reductions in consumer surplus, reductions in producer surplus and deadweight loss. The size of these changes depends on the price elasticities of demand and supply.

Let's consider another example. Imagine a $1 tax on every barrel of apples that an apple farmer produces. If the product (apples) is price inelastic to the consumer then the farmer is able to pass the entire tax on to consumers of apples by raising the price by $1. In this situation, consumers bear the entire burden of the tax, or the tax incidence falls on consumers. On the other hand, if the apple farmer is unable to raise prices because the product is price elastic, the farmer has to bear the burden of the tax through decreased revenues, therefore the tax incidence falls on the farmer. If the apple farmer can raise prices by an amount less than $1, then consumers and the farmer are sharing the tax burden. If demand is more inelastic than supply, consumers bear most of the tax burden, and if supply is more inelastic than demand, sellers bear most of the tax burden.

The intuition for this is simple. When the demand is inelastic, consumers are not very responsive to price changes, and the quantity demanded reduces only modestly when the tax is introduced. In the case of smoking, the demand is inelastic because consumers are addicted to the product. The government can then pass the tax burden along to consumers in the form of higher prices, without much of a decline in the equilibrium quantity.

Similarly, when a government introduces a tax in a market with an inelastic supply, such as, for example, beachfront hotels, and sellers have no alternative than to accept lower prices for their business, taxes do not greatly affect the equilibrium quantity. The tax burden now passes on to the sellers. If the supply was elastic and sellers had the possibility of reorganizing their businesses to avoid supplying the taxed good, the tax burden on the sellers would be much smaller. The tax would result in a much lower quantity sold instead of lower prices received. Figure 1 illustrates this relationship between the tax incidence and elasticity of demand and supply.

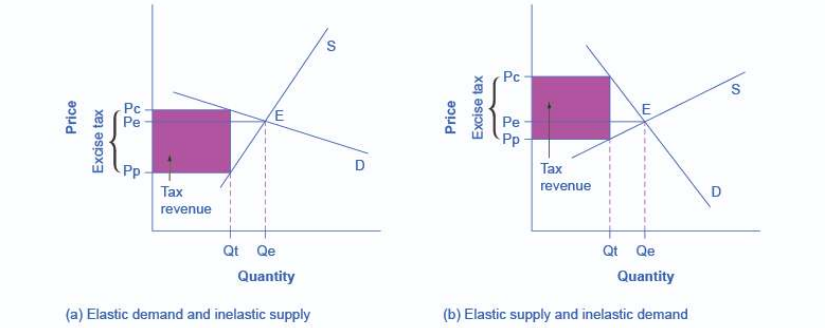


Figure 1. An excise tax introduces a wedge between the price paid by consumers (Pc) and the price received by producers (Pp). The vertical distance between Pc and Pp is the amount of the tax per unit. Pe is the equilibrium price prior to introduction of the tax. (a) When the demand is more elastic than supply, the tax incidence on consumers Pc – Pe is lower than the tax incidence on producers Pe – Pp. (b) When the supply is more elastic than demand, the tax incidence on consumers Pc – Pe is larger than the tax incidence on producers Pe – Pp. The more elastic the demand and supply curves, the lower the tax revenue.

In Figure 1(a), the supply is inelastic and the demand is elastic, such as in the example of beachfront hotels. While consumers may have other vacation choices, sellers can't easily move their businesses. By introducing a tax, the government essentially creates a wedge between the price paid

by consumers Pc and the price received by producers Pp. In other words, of the total price paid by consumers, part is retained by the sellers and part is paid to the government in the form of a tax. The distance between Pc and Pp is the tax rate. The new market price is Pc, but sellers receive only Pp per unit sold, as they pay Pc-Pp to the government. Since we can view a tax as raising the costs of production, this could also be represented by a leftward shift of the supply curve, where the new supply curve would intercept the demand at the new quantity Qt. For simplicity, Figure 1 omits the shift in the supply curve.

The tax revenue is given by the shaded area, which we obtain by multiplying the tax per unit by the total quantity sold Qt. The tax incidence on the consumers is given by the difference between the price paid Pc and the initial equilibrium price Pe. The tax incidence on the sellers is given by the difference between the initial equilibrium price Pe and the price they receive after the tax is introduced Pp. In Figure 1(a), the tax burden falls disproportionately on the sellers, and a larger proportion of the tax revenue (the shaded area) is due to the resulting lower price received by the sellers than by the resulting higher prices paid by the buyers. Figure 1(b) describes the example of the tobacco excise tax where the supply is more elastic than demand. The tax incidence now falls disproportionately on consumers, as shown by the large difference between the price they pay, Pc, and the initial equilibrium price, Pe. Sellers receive a lower price than before the tax, but this difference is much smaller than the change in consumers' price. From this analysis one can also predict whether a tax is likely to create a large revenue or not. The more elastic the demand curve, the more likely that consumers will reduce quantity instead of paying higher prices. The more elastic the supply curve, the more likely that sellers will reduce the quantity sold, instead of taking lower prices. In a market where both the demand and supply are very elastic, the imposition of an excise tax generates low revenue.

Some believe that excise taxes hurt mainly the specific industries they target. For example, the medical device excise tax, in effect since 2013, has been controversial for it can delay industry profitability and therefore hamper start-ups and medical innovation. However, whether the tax burden falls mostly on the medical device industry or on the patients depends simply on the elasticity of demand and supply.

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Learning Objectives

[glossary-page][glossary-term]tax incidence: [/glossary-term]
[glossary-definition]distribution of the tax burden between buyers and sellers[/glossary-definition][/glossary-page]

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5.18: Putting It Together- Elasticity

Netflix Pricing Revisited

We began this module discussing a price change that Netflix imposed on its customers. Now that we understand price elasticity, we can better evaluate that case. How did the 60 percent price increase end up for Netflix? It was a very bumpy two-year ride. Before the price increase, there were about 24.6 million U.S. subscribers. After the price increase, 810,000 infuriated customers canceled their Netflix subscriptions, dropping the total number of subscribers to 23.79 million. Fast-forward to June 2013, when there were 36 million streaming Netflix subscribers in the United States. This was an increase of 11.4 million subscribers since the price increase—an average per-quarter growth of about 1.6 million. This growth is less than the 2 million-per-quarter increases Netflix experienced in the fourth quarter of 2010 and the first quarter of 2011.

During the first year after the price increase, the firm's stock price (a measure of future expectations for the firm) fell from about $300 per share to just under $54. By June 2013, the stock price had rebounded to about $200 per share—still off by more than one-third from its high, but definitely improving. What happened? Obviously, Netflix understood the law of demand. Company officials reported, when they announced the price increase, that this could result in the loss of about 600,000 existing subscribers. Using the elasticity of demand formula, it is easy to see that they expected an inelastic response:



$$\begin{array}{rcl}\text{Percent change in quantity}&=&\large{\frac{-600,000}{(24\text{ million}+24.6\text{ million})\div{2}}} \\ \text{Percent change in price}&=&\large{\frac{\$6}{(\$10+\$16)\div{2}}} \\ \text{Price Elasticity of Demand}&=&\large{\frac{-600,000/24.3\text{ million}}{\$6/\$13}}\\&=&\large{\frac{-0.025}{0.46}}\\&=&-0.05 \end{array}$$

In addition, Netflix officials had expected that the price increase would have little impact on attracting new customers. Netflix anticipated adding up to 1.29 million new subscribers in the third quarter of 2011. It is true that this was slower growth than the firm had experienced over the past year—about 2 million per quarter. Why was the estimate of customers leaving so far off? During the fourteen years after Netflix was founded, there was an increase in the number of close, but not perfect, substitutes. Consumers now had choices ranging from Vudu, Amazon Prime, Hulu, and Redbox to retail stores.

Jaime Weinman reported in *Maclean's* that Redbox kiosks are "a five-minute drive or less from 68 percent of Americans, and it seems that many people still find a five-minute drive more convenient than loading up a movie online." It seems that, in 2012, many consumers still preferred a physical DVD disk over streaming video. What missteps did the Netflix management make? In addition to misjudging the elasticity of demand, by failing to account for close substitutes, it seems they may have also misjudged customers' preferences and tastes (at the time being). Yet, we now see that as the population has increased, the preference for streaming video has overtaken the desire for physical DVD discs. Netflix, the target of numerous late-night talk-show jabs and laughs in 2011, may have had the last laugh in the end.

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5.19: Discussion- Junk Food and Elasticity

Respond to the following prompts in a post with a minimum of 200 words, then comment on at least TWO other posts.

- Recently there has been discussion in the news about taxing junk food (soft drinks, for example) in an effort to reduce the incidence of obesity in the U.S. Do you think the demand for junk food is elastic or inelastic with respect to price?
- Based on your knowledge of the price elasticity of demand, do you think the deadweight loss of a soda/junk-food tax would be relatively large or relatively small? Why? Do you think taxing junk food would be a good idea? Based on your analysis, would it really help reduce the number of obese people in the United States? Explain.

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5.20: Assignment- Elasticity and Tuition

Part 1: Imagine that tuition for your schooling has increased by 20%. How do you think this will affect demand and consumer behavior? Why? How would you describe the elasticity of your tuition? Explain.

Part 2: Imagine that there are currently 10,000 students enrolled at your institution. The school decides to increase tuition, and enrollment falls to 9,000. Tuition started at $4,000 per semester but has since gone up to $4,800. What is the elasticity of demand?

Part 3: How will this impact total revenue for your institution? What inferences can you make from this information?

Criteria	Not Evident	Developing	Proficient	Distinguished	Weight
Describe the elasticity of tuition.					5
Explain how an increase in tuition will impact demand and consumer behavior.					5
Solve for the elasticity of demand					5
Explain the impact of the tuition increase on total revenue					5
				Total:	__/20

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CHAPTER OVERVIEW

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6.3: Putting It Together- GDP and Economic Growth
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6.1: Why It Matters- GDP and Economic Growth

Why use macroeconomic indicators, like GDP, to evaluate economic performance?



When you go to a doctor's appointment, they check your weight, your heartbeat, and your blood pressure. They ask how you are feeling. They may also do other medical tests. What blood pressure measures, or what the laboratories look for in a urinalysis or blood test may not be intrinsically interesting (e.g. how is blood sugar measured?), but the results of the tests are anything but unimportant. Those results indicate how healthy or sick you are. They are necessary diagnostics for you and your doctor to determine what you need to do to improve your health, whether you are currently sick or you just want to improve the quality or length of your life.



That is a good metaphor for thinking about the present module. Up until this point, we've been studying introductory economics with a focus on microeconomics, which examines the behavior of individual agents, like people and businesses, within an economy. This module is the first to focus on macroeconomics, which is the study of the economy as a whole. You could think of it as the study of the general economic health of a nation. In macroeconomics, we will look at broad issues such as growth of production, unemployment rates, inflation, government deficits, and levels of exports and imports.

Just as there are medical tests to assess your physical health, there are economic measures and indicators that can reveal important insights into a nation's economy. This module introduces you to one most important economic indicators for determining the state of a nation's macro economy: GDP. Together with unemployment and inflation, these indicators help economist determine the general health of a nation's economy. Are you planning to start a career or make a career change in the future? Are you interested in purchasing a home, or selling one that you already own? How about buying a new car? What about saving for retirement? If so, what's the best place to put your savings? These are all questions that require some knowledge of how the economy is doing, now and in the future. This module will help you come up with better answers to those questions.

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6.2: A Healthy Climate for Economic Growth

Learning Objectives

- Identify factors that contribute to a healthy climate for economic growth
- Explain the importance of the rule of law, property rights, and contractual rights in supporting economic growth

While physical and human capital deepening and better technology are important, equally important to a nation's well-being is the climate or system within which these inputs are cultivated. Both the type of market economy and a legal system that governs and sustains property rights and contractual rights are important contributors to a healthy economic climate.

A healthy economic climate usually involves some sort of market orientation at the microeconomic, individual, or firm decision-making level. Markets that allow personal and business rewards and incentives for increasing human and physical capital encourage overall macroeconomic growth. For example, when workers participate in a competitive and well-functioning labor market, they have an incentive to acquire additional human capital, because additional education and skills will pay off in higher wages. Firms have an incentive to invest in physical capital and in training workers, because they expect to earn higher profits for their shareholders. Both individuals and firms look for new technologies, because even small inventions can make work easier or lead to product improvement. Collectively, such individual and business decisions made within a market structure add up to macroeconomic growth. Much of the rapid growth since the late nineteenth century has come from harnessing the power of competitive markets to allocate resources. This market orientation typically reaches beyond national borders and includes openness to international trade.

Rule of Law and Economic Growth

Economic growth depends on many factors. Key among those factors is adherence to the **rule of law** and protection of **property rights** and **contractual rights** by a country's government so that markets can work effectively and efficiently. Laws must be clear, public, fair, enforced, and equally applicable to all members of society. Property rights are the rights of individuals and firms to own property and use it as they see fit. If you have $100, you have the right to use that money, whether you spend it, lend it, or keep it in a jar. It is your property. The definition of property includes physical property as well as the right to your training and experience, especially since your training is what determines your livelihood. The use of this property includes the right to enter into contracts with other parties with your property. Individuals or firms must own the property to enter into a contract.

Contractual rights, then, are based on property rights and they allow individuals to enter into agreements with others regarding the use of their property providing recourse through the legal system in the event of noncompliance. One example is the employment agreement: a skilled surgeon operates on an ill person and expects to get paid. Failure to pay would constitute a theft of property by the patient; that property being the services provided by the surgeon. In a society with strong property rights and contractual rights, the terms of the patient–surgeon contract will be fulfilled, because the surgeon would have recourse through the court system to extract payment from that individual. Without a legal system that enforces contracts, people would not be likely to enter into contracts for current or future services because of the risk of non-payment. This would make it difficult to transact business and would slow economic growth.

The World Bank considers a country's legal system effective if it upholds property rights and contractual rights. The World Bank has developed a ranking system for countries' legal systems based on effective protection of property rights and rule-based governance using a scale from 1 to 6, with 1 being the lowest and 6 the highest rating. In 2012, the world average ranking was 2.9. The three countries with the lowest ranking of 1.5 were Afghanistan, the Central African Republic, and Zimbabwe; their GDP per capita was $1,000, $800, and $600 respectively. Afghanistan is cited by the World Bank as having a low standard of living, weak government structure, and lack of adherence to the rule of law, which has stymied its economic growth. The landlocked Central African Republic has poor economic resources as well as political instability and is a source of children used in human trafficking. Zimbabwe has had declining growth since 1998. Land redistribution and price controls have disrupted the economy, and corruption and violence have dominated the political process. Although global economic growth has increased, those countries lacking a clear system of property rights and an independent court system free from corruption have lagged far behind.

A general orientation toward markets does not rule out important roles for government. There are times when markets fail to allocate capital or technology in a manner that provides the greatest benefit for society as a whole. The role of the government is to correct these failures. In addition, government can guide or influence markets toward certain outcomes. The following examples highlight some important areas that governments around the world have chosen to invest in to facilitate capital deepening and technology:

- **Education**. The Danish government requires all children under 16 to attend school. They can choose to attend a public school (*Folkeskole*) or a private school. Students do not pay tuition to attend *Folkeskole*. Thirteen percent of primary/secondary (elementary/high) school is private, and the government supplies vouchers to citizens who choose private school.
- **Savings and Investment**. In the United States, as in other countries, private investment is taxed. Low capital gains taxes encourage investment and so also economic growth.
- **Infrastructure**. The Japanese government in the mid-1990s undertook significant infrastructure projects to improve roads and public works. This in turn increased the stock of physical capital and ultimately economic growth.
- **Special Economic Zones**. The island of Mauritius is one of the few African nations to encourage international trade in government-supported *special economic zones (SEZ)*. These are areas of the country, usually with access to a port where, among other benefits, the government does not tax trade. As a result of its SEZ, Mauritius has enjoyed above-average economic growth since the 1980s. Free trade does not have to occur in an SEZ however. Governments can encourage international trade across the board, or surrender to protectionism.
- **Scientific Research**. The European Union has strong programs to invest in scientific research. The researchers *Abraham García* and *Pierre Mohnen* demonstrate that firms which received support from the Austrian government actually increased their research intensity and had more sales. Governments can support scientific research and technical training that helps to create and spread new technologies. Governments can also provide a legal environment that protects the ability of inventors to profit from their inventions.

There are many more ways in which the government can play an active role in promoting economic growth that we will explore more in later modules. A healthy climate for growth in GDP per capita and labor productivity includes human capital deepening, physical capital deepening, and technological gains, operating in a market-oriented economy with supportive government policies.

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Learning Objectives

[glossary-page][glossary-term]contractual rights: [/glossary-term]
[glossary-definition]the rights of individuals to enter into agreements with others regarding the use of their property providing recourse through the legal system in the event of noncompliance[/glossary-definition][glossary-term]rule of law: [/glossary-term][glossary-definition]the process of enacting laws that protect individual and entity rights to use their property as they see fit. Laws must be clear, public, fair, and enforced, and applicable to all members of society[/glossary-definition]
[glossary-term]special economic zone (SEZ): [/glossary-term]
[glossary-definition]area of a country, usually with access to a port where, among other benefits, the government does not tax trade[/glossary-definition][/glossary-page]

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6.3: Putting It Together- GDP and Economic Growth



This module began discussion of how to assess the state of the economy using the concept of Gross Domestic Product (GDP), the broadest measure of economic activity we have. We learned what GDP is and how it is measured. We also learned the critical distinction between nominal and real GDP.

The sheer size of the U.S. economy as measured by GDP is huge—as of the fourth quarter of 2016, $18.9 trillion worth of goods and services were produced annually. Real GDP informed us that the 2008–2009 recession was severe and that the recovery from that recession has been slow, but the economy is improving. GDP per capita gives a rough estimate of a nation's standard of living.

A key use of GDP is measuring economic growth, i.e. the percentage change in real GDP. We learned that improvements in a nation's standard of living over time are largely determined by economic growth. We also explored some of the most important factors that contribute to economic growth.

This module is the building block for other modules that examine more economic indicators such as unemployment, inflation, or interest rates. Later, we'll come to see how these economic indicators are related and what causes them to rise or fall.

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6.4: Discussion- GDP and Economic Growth

Respond to the following prompts in a post with a minimum of 150 words, then comment on at least TWO other posts.

- Gross Domestic Product was designed as a measure of economic activity, specifically a measure of national production. Despite this intent, GDP is widely interpreted as a measure of economic welfare or standard of living (when measured in per capita terms). What are the shortcomings of using GDP as a measure of economic welfare? What would you like to add to (or subtract from) GDP to make it a better reflection of how well people are doing in a nation? Don't limit yourself to ideas from the module.

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6.5: Assignment- Data Project Part 1

After completing this project, you will have an understanding of what data is used to monitor the economy, and where it is found. The three key economic indicators are GDP, unemployment, and inflation. This is the economic data you often hear reported in the news and that is mentioned in the text. So far, we have focused on GDP, so we'll start with that and then add our analysis of unemployment and inflation in the next module.

Assignment

PART 1: Go to the Bureau of Economic Analysis/National Income Accounts site http://www.bea.gov/newsreleases/national/gdp/gdpnewsrelease.htm. The first thing you will see is the News Release that is reported each month.

Look to the right side of the page for the "Full Release & Tables." The PDF file is good if you want to print a copy; the full text file is easier to work with online. Scroll down from the news release to find the tables. Take a moment to look at all the tables and the variety of information available.

Using Table 3: "Gross Domestic Product and Related Measures" answer questions 1 through 8. Show your calculations. Use the Current Dollars section on the left. You'll note that the annual total is given in the left column, with quarterly breakdowns to the right. You'll have to scroll down for the second part of the table. (To find the % that any value is of GDP divide that value by GDP and multiply by 100. For instance, if PCE is 8,000 and GDP is 10,000, than PCE is 8/10 x100 or 80% of GDP. Be sure to ask if you have questions about these calculations)

1. What is the release date of the report you are using?
2. What was the current dollar value of GDP for last year?
3. What was the current dollar value of personal consumption last year?
4. What percentage of GDP was Personal Consumption Expenditure (PCE) last year?
5. What percentage of GDP was Gross Private Domestic Investment last year?
6. What percentage of GDP was government spending (Government Consumption Expenditures and Gross Investment) last year?
7. What percentage of GDP was Net Exports last year?
8. What is the sum of these percentages? Do you think that is correct? Why? Do any of these percentages surprise you? Which ones?

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6.6: Assignment- Problem Set — GDP and Economic Growth

Click on the following link to download the problem set for this module:

- GDP and Economic Growth Problem Set

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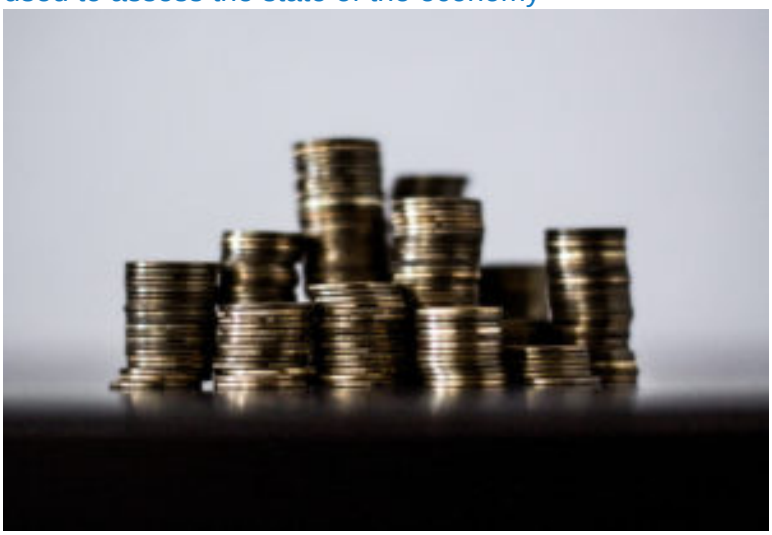
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6.7: Introduction to Macroeconomics and GDP

What you'll learn to do: define macroeconomics and explain how economic indicators like GDP are used to assess the state of the economy



This section will help you understand what macroeconomics is and how it differs between microeconomics. You will also learn how economists use economic indicators like GDP, inflation, and unemployment rates to assess the health of an economy. A key distinction for understanding the state of an economy is the difference between nominal and real measurements.

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6.8: The Macroeconomic Perspective

Learning Objectives

- Define macroeconomics
- Identify the major economic indicators used to assess the state of the macroeconomy

How is the Economy Doing? How Can We Know?



Figure 1. The Great Depression. At times, such as when many people are in need of government assistance, it is easy to tell how the economy is doing. This photograph shows people lined up during the Great Depression, waiting for relief checks. At other times, when some are doing well and others are not, it is more difficult to ascertain how the economy of a country is doing. (Credit: modification of work by the U.S. Library of Congress/Wikimedia Commons)

The 1990s were boom years for the U.S. economy. The late 2000s, from 2007 to 2013 were not. What causes the economy to expand or contract? Why do businesses fail when they are making all the right decisions? Why do workers lose their jobs when they are hardworking and productive? Are bad economic times a failure of the market system? Are they a failure of the government?

These are all questions of macroeconomics, which we will begin to address in this module. We will not be able to answer all of these questions here, but we will start with the basics: How is the economy doing? How can we tell?

The macro economy includes all buying and selling, all production and consumption; everything that goes on in every market in the economy. The quest to measure the macro economy began more than 80 years ago, during the Great Depression. President Franklin D. Roosevelt and his economic advisers knew things were bad—but how could they express and measure just how bad it was? An economist named Simon Kuznets, who later won the Nobel Prize for his work, came up with a way to track what the entire economy is producing. The result—gross domestic product (GDP)—remains our basic measure of macroeconomic activity. In this module, you will learn how GDP is constructed, how it is used, and why it is so important.

Macroeconomics

Macroeconomics focuses on the economy as a whole (or on whole economies as they interact). It describes what causes recessions, and what makes unemployment stay high when recessions are supposed to be over. Macroeconomics addresses why some countries grow faster than others, and have higher standards of living than others. Macroeconomics involves adding up the economic activity of all households and all businesses in all markets to get the overall demand and supply in the economy. However, when we do that, something curious happens. It is not unusual that what results at the macro level is different from the sum of the microeconomic parts. Indeed, what seems sensible from a microeconomic point of view can have unexpected or counterproductive results at the macroeconomic level. If this were not the case, we wouldn't need macroeconomics as a separate discipline and we could simply use microeconomics to study macroeconomic issues. We use the term **macroeconomic externality** to describe when what happens at the macro level is different from and inferior to what happens at the micro level.

Imagine that you are sitting at an event with a large audience, like a live concert or a basketball game. A few people decide that they want a better view, and so they stand up. However, when these people stand up, they block the view for other people, and the others need to stand up as well if they wish to see. Eventually, nearly everyone is standing up, and as a result, no one can see much better than before. The rational decision of some individuals at the micro level—to stand up for a better view—ended up being self-defeating at the macro level. This is not macroeconomics, but it is an apt analogy.

Try It

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The economy as a whole is massive. In order to determine how it is doing we use “economic indicators”— statistics that measure one or more aspects of the macro economic.

There is no one economic indicator that tells the whole story of the economy, so economists look at a variety of indicators some of which include:

- measures of aggregate production, like GDP
- measures of employment and unemployment, and measures of inflation, like the percent change in the Consumer Price Index
- the “Misery Index”—the sum of the inflation and unemployment rates as a measure of how bad (i.e., miserable) the economy is

The U.S. Department of Commerce even calculates the Index of Leading Economic Indicators, which is one attempt to combine multiple economic indicators to come up with one number that tries to predict the future path of the economy.

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Macroeconomic Goals, Framework, and Policies



Figure 2. This chart shows what macroeconomics is about. The box on the left indicates a consensus of what are the most important goals for the macro economy, the middle box lists the frameworks economists use to analyze macroeconomic changes (such as inflation or recession), and the box on the right indicates the two tools the federal government uses to influence the macro economy.

Goals

In thinking about the overall health of the macroeconomy, it is useful to consider three primary goals: economic growth, full employment (or low unemployment), and stable prices (or low inflation).

- Economic growth ultimately determines the prevailing standard of living in a country. Economic growth is measured by the percentage change in real (inflation-adjusted) gross domestic product. Since the annual growth rate of the U.S. over the last hundred years averaged 3% per year, a growth rate above 3% is considered good.
- Unemployment, as measured by the unemployment rate, is the percentage of people in the labor force who do not have a job. When people lack jobs, the economy is wasting a precious resource-labor, and the result is lower goods and services produced. Unemployment, however, is more than a statistic—it represents people’s livelihoods. While measured unemployment is unlikely to ever be zero, a measured unemployment rate of 5% or less is considered full employment.
- Inflation is a sustained increase in the overall level of prices. If many people face a situation where the prices that they pay for food, shelter, and healthcare are rising much faster than the wages they receive for their labor, there will be widespread unhappiness as their standard of living declines. For that reason, low inflation—an inflation rate of less than 5%—is a major goal.

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Frameworks

Economists use theories and models to explain and understand economic principles. In microeconomics, we used the theories of supply and demand; in macroeconomics, we use the theories of aggregate demand (AD) and aggregate supply (AS). This book presents two perspectives on macroeconomics: the Neoclassical perspective and the Keynesian perspective, each of which has its own version of AD and AS. Between the two perspectives, you will obtain a good understanding of what drives the macroeconomy.

Policy Tools

National governments have two sets of tools for influencing the macroeconomy. The first is monetary policy, which involves managing the interest rates and the availability of credit. The second is fiscal policy, which involves changes in government spending/purchases and taxes.

Each of the items in Figure 2 will be explained in detail in one or more other modules. As you learn these things, you will discover that the goals and the policy tools are in the news almost every day.

Learning Objectives

[glossary-page][glossary-term]macroeconomic externality: [/glossary-term][glossary-definition]occurs when what happens at the macro level is different from and inferior to what happens at the micro level; an example would be where upward sloping supply curves for firms become a flat aggregate supply curve, illustrating that the price level cannot fall to stimulate aggregate demand[/glossary-definition]
[/glossary-page]

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6.9: What is Gross Domestic Product?

Learning Objectives

- Explain gross domestic product (GDP) and what is counted as a final good or service

Measuring the Size of the Economy: Gross Domestic Product

Macroeconomics is an empirical subject, meaning that it is verifiable by observation or experience rather than just theory. Given this, the first step toward understanding macroeconomic concepts is to measure the economy.

How large is the U.S. economy? The size of a nation's overall economy is typically measured by its **gross domestic product** (GDP), which is the value of all final goods and services produced within a country in a given year. The measurement of GDP involves counting up the production of millions of different goods and services—smart phones, cars, music downloads, computers, steel, bananas, college educations, and all other new goods and services produced in the current year—and summing them into a total dollar value. This task is conceptually straightforward: take the quantity of everything produced, multiply it by the price at which each product sold, and add up the total. In 2016, the U.S. GDP totaled $18.6 trillion, the largest GDP in the world.



Figure 1. These packaged foods and other products in a grocery store make up just a small sampling of all the goods and services in an economy.

What are Final Goods and Services?—The Problem of Double Counting

GDP is defined as the current value of all **final goods and services** produced in a nation in a year. What are final goods? They are goods or services at their furthest stage of production at the end of a year. Statisticians who calculate GDP must avoid the mistake of double counting, in which output is counted more than once as it travels through the stages of production. For example, imagine what would happen if government statisticians first counted the value of tires produced by a tire manufacturer, and then counted the value of a new truck sold by an automaker that contains those tires. In this example, the value of the tires would have been counted twice-because the value of the truck already includes the value of the tires.

To avoid this problem, which would overstate the size of the economy considerably, when government statisticians compute the GDP at the end of the year, they count just the value of final goods and services in the chain of production. Intermediate goods, which are goods that are used in the production of other goods, are excluded from GDP calculations.

From the example above, government statisticians would count the value of the truck plus the value of any tires that were produced but not yet put on trucks, since at the end of the year, those tires are counted as final goods. Next year, when the tires are put on new trucks, GDP will include the value of the new trucks less the value of the tires that were counted this year. If this sounds complicated, remember the point is to only count things that get produced once.

The concept of GDP is fairly straightforward: it is just the dollar value of all final goods and services produced in the economy in a year. In our decentralized, market-oriented economy, actually calculating the more than $16 trillion-dollar U.S. GDP—along with how it is changing every few months—is a full-time job for a brigade of government statisticians.

What is counted in GDP?

- Final goods and services
- Intermediate goods that have not yet been used in final goods and services.

- Raw materials that have been produced, but not yet used in the production of intermediate or final goods.

What is not included in GDP?

- Intermediate goods that have been turned into final goods and services (e.g. tires on a new truck)
- Used goods
- Transfer payments
- Non-market activities
- Illegal goods

Notice the items that are not counted into GDP, as outlined in the list above. The sales of used goods are not included because they were produced in a previous year and are part of that year's GDP. Transfer payments are payments by the government to individuals, such as Social Security. Transfers are not included in GDP, because they do not represent production. Production of non-marketed goods and services—such as home production like when you clean your home—is not counted because these services are not sold in the marketplace. By contrast, if you hire Merry Maids to clean your home, your payments do count as part of GDP, because the transaction is counted as going through the marketplace. Finally, the entire underground economy of services paid "under the table" as well as any other illegal sales should be counted, but are not, because they are not reported in any way. In a recent study by Friedrich Schneider of Shadow Economies, the underground economy in the United States was estimated to be 6.6% of GDP, or close to $2 trillion dollars in 2013 alone.

Economists generally estimate GDP using a method called the Expenditure Approach. Let's explore that next.

Try It

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Watch It

Watch this explanation of what GDP is and what is included (and *not* included) when it is measured. You'll learn more details about each of these components of GDP soon.

A link to an interactive elements can be found at the bottom of this page.

Try It

These questions allow you to get as much practice as you need, as you can click the link at the top of the first question ("Try another version of these questions") to get a new set of questions. Practice until you feel comfortable doing the questions.

[ohm_question]152050-152051[/ohm_question]

Learning Objectives

[glossary-page][glossary-term]final goods and services: [/glossary-term]
[glossary-definition]goods or services at the furthest stage of their production at the end of a year; that is, they have either been sold to consumers, or they are intermediate goods or raw materials that have not yet been used to produce final goods[/glossary-definition][glossary-term]gross domestic product (GDP): [/glossary-term][glossary-definition]the value of the output of all goods and services produced within a country in a year[/glossary-definition][/glossary-page]

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6.10: Calculating GDP

Learning Objectives

- Describe how GDP it is measured as a component of total expenditure (demand)
- Explain how gross domestic product can be broken down and measured as different types of product

The Expenditure Approach: GDP Measured by Components of Demand

If we know that GDP is the measurement of everything that is produced, we should also ask the question, *who buys all of this production*? This demand can be divided into four main parts:

1. consumer expenditure (consumption)
2. investment expenditure
3. government expenditure on goods and services
4. net export expenditure

Try It

What do economists mean by investment, or investment expenditure? In calculating GDP, investment does *not* refer to the purchase of stocks and bonds or the trading of financial assets. It refers to the purchase of new capital goods, that is, business equipment, new commercial real estate (such as buildings, factories, and stores), residential housing construction, and inventories. Inventories that are produced this year are included in this year's GDP—even if they have not yet sold. From the accountant's perspective, it is as if the firm invested in its own inventories. Business investment in 2012 was over $2 trillion, according to the U.S. Bureau of Economic Analysis.

Table 1 shows how these four components of demand added up to the GDP in 2016.

Table 1. Components of U.S. GDP in 2016: From the Expenditure Side

	Components of GDP (in trillions of dollars)	**Percentage of Total**
Consumption	$12.8	68.7%
Investment	$3.0	16.3%
Government	$3.3	17.6%
Net Exports	-$.50	-2.7
Exports	$2.2	12.0%
Imports	–$2.7	–14.7%
Total GDP	**$18.6**	**100%**

Source: http://bea.gov/ Table 1.1.5 Gross Domestic Product

Figure 1 provides a visual representation of the five categories used to measure GDP by the components of demand.

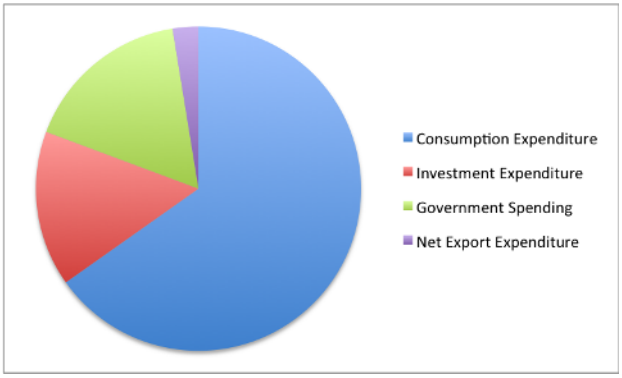


Figure 1. Components of U.S. GDP. Consumption accounted for 68.7% of total GDP, investment expenditure for 16.3%, government spending for 17.6%, while net exports (exports minus imports) actually subtracted 2.7% from total GDP. The pie chart gives a nice visual of the components of GDP, but keep in mind that since the net export expenditure share is negative, the size of the pie is only approximately correct.

Figure 2(a) shows the levels of consumption, investment, and government purchases over time, expressed as a percentage of GDP. Consumption expenditure, that is, spending by households and individuals, is about two-thirds of GDP, but it moves relatively little over time. Investment expenditure and government spending on goods and services are each about the same order of magnitude, 15-20% of GDP. Investment is the most variable category of expenditure, increasing and decreasing more than the other categories. Figure 2(b) shows the levels of exports and imports as a percentage of GDP over time. Exports are added to total demand for goods and services, while imports are subtracted from total demand. If exports exceed imports, as in most of the 1960s and 1970s in the U.S. economy, a trade surplus exists. If imports exceed exports, as in recent years, then a **trade deficit** exists.

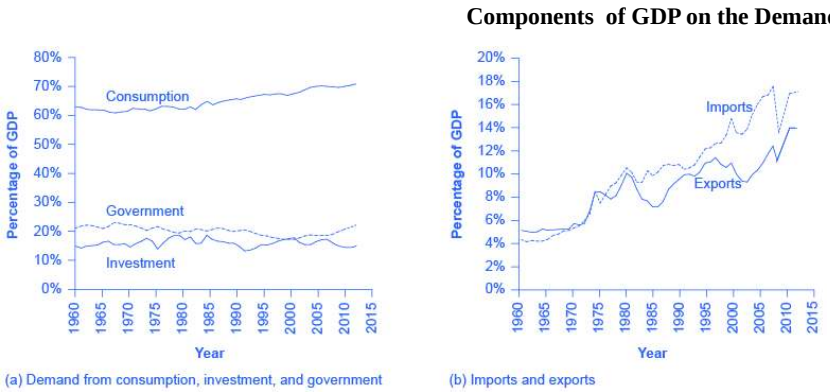


Figure 2. Components of GDP. (Source: http://bea.gov/iTable/iTable.cfm?ReqID=9&step=1).

Let's take a closer look at these components of demand:

Consumption

- **Consumption expenditure** by households is the largest component of GDP, accounting for more than two-thirds of the GDP in any year. This tells us that consumers' spending decisions are a major driver of the economy. However, consumer spending is a gentle elephant: when viewed over time, it does not jump around too much (as shown in Figure 2). In recent years, consumption has been creeping up towards 70%.

Investment

- **Investment expenditure** refers to purchases of physical plant and equipment, primarily by businesses. If Starbucks builds a new store, or Amazon buys robots, these expenditures are counted under business investment. **Investment demand** is far smaller than **consumption demand**, typically accounting for only about 15–18% of GDP, but it is very important for the economy because this is where jobs are created. However, it fluctuates more noticeably than consumption. Business investment is volatile; new technology or a new product can spur business investment, but then confidence can drop and business investment can pull back sharply.
- Investment includes any addition to business inventories.

Government Spending

- If you noticed any of the infrastructure projects (new bridges, highways, airports) launched during the recession of 2009, you saw how important government spending can be for the economy. Government expenditure in the United States is about 20% of GDP, and includes spending by all three levels of government: federal, state, and local.
- The only part of government spending counted in GDP is government purchases of goods or services produced in the economy. Examples include the government buying a new fighter jet for the Air Force (federal government spending), building a new highway (state government spending), or a new school (local government spending).
- A significant portion of government budgets are transfer payments, like unemployment benefits, veteran's benefits, and Social Security payments to retirees. These payments are *excluded* from GDP because the government does not receive a new good or service in return or exchange. Instead they are transfers of income from taxpayers to others. What taxpayers spend the income on is captured in consumer expenditure.

Net Exports, or Trade Balance

- When thinking about the demand for domestically produced goods in a global economy, it is important to count spending on exports—domestically produced goods that are purchased by foreigners. By the same token, we must also subtract spending on imports—goods produced in other countries that are purchased by residents of this country. The net export component of GDP is equal to the value of exports (X) minus the value of imports (M), (X – M). The gap between exports and imports is also called the **trade balance**. If a country's exports are larger than its imports, then a country is said to have a **trade surplus**. In the United States, exports typically exceeded imports in the 1960s and 1970s, as shown in Figure 2(b).

Since the early 1980s, imports have typically exceeded exports, and so the United States has experienced a *trade deficit* in most years. Despite growth in the trade deficit in the late 1990s and in the mid-2000s, the deficit typical remains less than 5% of GDP. Figure 2(b) also shows that imports and exports have both risen substantially in recent decades, even after the declines during the *Great Recession* between 2008 and 2009. As noted before, if exports and imports are equal, foreign trade has no effect on total GDP. However, even if exports and imports are balanced overall, foreign trade might still have powerful effects on particular industries and workers by causing nations to shift workers and physical capital investment toward one industry rather than another.

GDP Measured using Components of Demand

Based on these four components of demand, GDP can be measured as:

$$\text{GDP} = \text{Consumption} + \text{Investment} + \text{Government Spending} + \text{Net Exports}$$

$$\text{GDP} = C + I + G + (X - M)$$

Try It

https://assessments.lumenlearning.co...sessments/6977

Understanding how to measure GDP is important for analyzing connections in the macro economy and for thinking about macroeconomic policy tools.

How do Statisticians Measure GDP?

Government economists at the Bureau of Economic Analysis (BEA), within the U.S. Department of Commerce, construct estimates of GDP from a variety of sources.

- **Consumption.** Once every five years, in the second and seventh year of each decade, the U.S. Census Bureau carries out a detailed census of businesses throughout the United States. In between, it carries out a monthly survey of retail sales. These figures are adjusted with foreign trade data to account for exports that are produced in the United States and sold abroad and for imports that are produced abroad and sold here. Once every ten years, the Census Bureau also conducts a comprehensive survey of housing and residential finance. Together, these sources provide the main basis for figuring out what is produced for consumers.
- **Investment**. For investment, the Census Bureau carries out a monthly survey of construction and an annual survey of expenditures on physical capital equipment.
- **Government Spending**. For what is purchased by the federal government, the statisticians rely on the U.S. Department of the Treasury. An annual Census of Governments gathers information on state and local governments. Because a lot of government spending at all levels involves hiring people to provide services, a large portion of government spending is also tracked through payroll records collected by state governments and by the Social Security Administration.
- **Net Exports**: With regard to foreign trade, the Census Bureau compiles a monthly record of all import and export documents. Additional surveys cover transportation and travel, and adjustment is made for financial services that are produced in the United States for foreign customers.

Many other sources contribute to the estimates of GDP. Information on energy comes from the U.S. Department of Transportation and Department of Energy. Information on healthcare is collected by the Agency for Health Care Research and Quality. Surveys of landlords provide information about rental income. The Department of Agriculture collects statistics on farming.

All of these bits and pieces of information arrive in different forms, at different time intervals. The BEA melds them together to produce estimates of GDP on a quarterly basis (every three months). These numbers are then "annualized" by multiplying by four. That is, quarterly GDP estimates what annual GDP would be if the trend over the three months continued for twelve months. As more information comes in, these estimates are updated and revised. The "advance" estimate of GDP for a certain quarter is released one month after a quarter. The "preliminary" estimate comes out one month after that. The "final" estimate is published one month later, but it is not actually final. In July, roughly updated estimates for the previous calendar year are released. Then, once every five years, after the results

of the latest detailed five-year business census have been processed, the BEA revises all of the past estimates of GDP according to the newest methods and data, going all the way back to 1929. Visit this website to read FAQs on the BEA site. You can even email your own questions!

GDP Measured by Type of Product

The Expenditure Approach divides GDP based on who is doing the spending: Consumption (households), Investment (businesses and households), Government Spending (governments) and Net Exports (the rest of the world).

GDP can also be measured by examining what is *produced*, instead of what is demanded. Everything that is purchased must be produced first. Table 2 breaks down GDP a different way, based on the type of output produced: **durable goods**, **nondurable goods**, **services**, **structures**, and the change in **inventories**.

Consumer Expenditure (from the expenditure approach you read about above) consists of spending on durable goods, nondurable goods, and services. The same thing is true of Government and Net Export Expenditures. Investment Expenditures is a combination of durable goods (like business equipment) and structures e.g. factories, office buildings, retail stores and residential construction).

Table 2. GDP by Type of Product in 2016

	Components of GDP by Type of Product (in trillions of dollars)	**Percentage of Total**
Goods		
Durable goods	$3.0	16.3%
Nondurable goods	$2.5	13.1%
Services	$11.6	62.4%
Structures	$1.5	8.0%
Changes in inventories	$0.2	1.1%
Total GDP	**$18.6**	**100%**

Source: http://bea.gov Table 1.2.5 GDP by Major Type of Product

Figure 3 provides a visual representation of the five categories used to measure GDP by type of product.

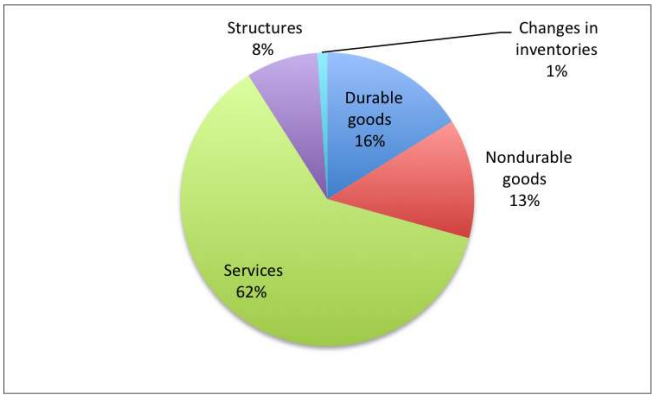


Figure 3. GDP by type of product, 2016.

Note that whether you decompose GDP into expenditure components or by type of product the total is exactly the same. Figure 4 shows the components of GDP by Type of Product, expressed as a percentage of GDP, since 1960. Services are the largest single component of GDP, representing over half. Nondurable goods used to be larger than durable goods, but in recent years, nondurable goods have been dropping closer to durable goods, which is about 15% of GDP. Structures hover around 10% of GDP, though they've been declining in recent years. The change in inventories, the final component of aggregate supply, is not shown here; it is typically less than 1% of GDP.

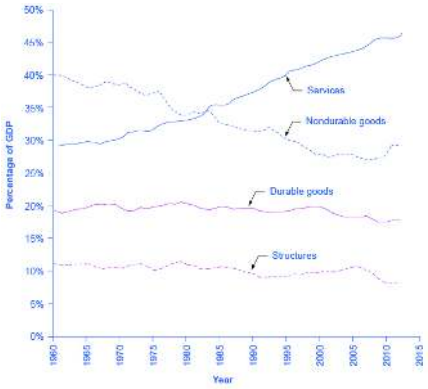


Figure 4. Types of Product.

Let's take a closer look at these components of GDP:

Goods and Services

In thinking about what is produced in the economy, many non-economists immediately focus on solid, long-lasting goods, like cars and computers. Goods that last three or more years are called durable goods. Goods that last less than three years are called nondurable goods. By far the largest part of GDP, however, is services. Moreover, services have been a growing share of GDP over time. A detailed breakdown of the leading service industries would include healthcare, education, and legal and financial services. It has been decades since most of the U.S. economy involved making solid objects. Instead, the most common jobs in a modern economy involve a worker looking at pieces of paper or a computer screen; meeting with co-workers, customers, or suppliers; or making phone calls.

Even within the overall category of goods, Table 2 shows that long-lasting durable goods like cars and refrigerators are about the same share of the economy as short-lived nondurable goods like food and clothing.

Structures

The category of structures includes everything from homes, to office buildings, shopping malls, and factories. The new structures that were built, or produced, during a time period are counted in this measure of GDP, which is another way of looking at investment, as it was discussed above in focusing on demand to measure GDP.

Change in Inventories

Inventories is a small category that refers to the goods that have been produced by one business but have not yet been sold to consumers, and are still sitting in warehouses and on shelves. The amount of inventories sitting on shelves tends to decline if business is better than expected, or to rise if business is worse than expected. When a business produces output but fails to sell it, the increase in inventory is treated as an investment expenditure.

Try It

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Another Way to Measure GDP: The National Income Approach

GDP is a measure of what is produced in a nation. The primary way GDP is estimated is with the Expenditure Approach we discussed above, but there is another way.

Everything a firm produces, when sold, becomes revenues to the firm. Businesses use revenues to pay their bills: Wages and salaries for labor, interest and dividends for capital, rent for land, profit to the entrepreneur, etc. So adding up all the income produced in a year provides a second way of measuring GDP. This is why the terms GDP and **national income** are sometimes used interchangeably. The total value of a nation's output is equal to the total value of a nation's income.

Try It

These questions allow you to get as much practice as you need, as you can click the link at the top of the first question ("Try another version of these questions") to get a new set of questions. Practice until you feel comfortable doing the questions.

[ohm_question]152052-152053[/ohm_question]

Learning Objectives

[glossary-page][glossary-term]durable good: [/glossary-term]
[glossary-definition]a good that last three years or more, such as a car or refrigerator[/glossary-definition][glossary-term]gross domestic product (GDP): [/glossary-term][glossary-definition]the value of the output of all final goods and services produced within a country in a year[/glossary-definition][glossary-term]inventory: [/glossary-term]
[glossary-definition]good that has been produced, but not yet been sold[/glossary-definition][glossary-term]national income: [/glossary-term]
[glossary-definition]includes all income earned: wages, profits, rent, and profit income[/glossary-definition][glossary-term]nondurable good: [/glossary-term][glossary-definition]a good that lasts less than three years, such as food and clothing[/glossary-definition][glossary-term]service: [/glossary-term][glossary-definition]product which is intangible (in contrast to goods) such as entertainment, healthcare, or education[/glossary-definition][glossary-term]structure: [/glossary-term]
[glossary-definition]building used as residence, factory, office building, retail store, or for other purposes[/glossary-definition][glossary-term]trade balance: [/glossary-term][glossary-definition]gap between exports and imports[/glossary-definition][glossary-term]trade deficit: [/glossary-term][glossary-definition]exists when a nation's imports exceed its exports and is calculated as imports – exports[/glossary-definition][glossary-term]trade surplus: [/glossary-term][glossary-definition]exists when a nation's exports exceed its imports and is calculated as exports – imports[/glossary-definition][/glossary-page]

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6.11: Alternative Ways to Measure the Economy

Learning Objectives

- Contrast and calculate GDP, GNP, and NNP

Besides GDP, there are several different but closely related ways of measuring the size of the economy. We mentioned above that GDP can be thought of as total production and as total purchases. It can also be thought of as total income since anything produced and sold produces income.

Gross National Product

One of the closest cousins of GDP is the **gross national product** (GNP). GDP includes only what is produced within a country's borders. GNP adds what is produced by domestic businesses and labor abroad, and subtracts out any payments sent home to other countries by foreign labor and businesses located in the United States. In other words, GNP counts the production of a nation's citizens and firms, whether they are located inside or outside the borders of the nation, while GDP measures all production that happens within the geographic boundaries of a nation. For the United States, the gap between GDP and GNP is relatively small; in recent years, only about 0.2%. For small nations, which may have a substantial share of their population working abroad and sending money back home, the difference can be substantial.

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Net National Product

Net national product (NNP) is calculated by taking GNP and then subtracting the value of how much physical capital is worn out, or reduced in value because of aging, over the course of a year. The process by which capital ages and loses value is called **depreciation**. The NNP can be further subdivided into **national income**, which includes all income to businesses and individuals, and **personal income**, which includes only income to people.

To get an idea of how these calculations work, follow the steps in the following feature.

CALCULATING GDP, NET EXPORTS, AND NNP

Based on the information in table below:

- What is the value of GDP?
- What is the value of net exports?
- What is the value of NNP?

Government purchases	$120 billion
Depreciation	$40 billion
Consumption	$400 billion
Investment	$60 billion
Exports	$100 billion
Imports	$120 billion
Income receipts from rest of the world	$10 billion
Income payments to rest of the world	$8 billion

Step 1. To calculate GDP use the following formula:

GDP = Consumption + Investment + Government spending + (Exports – Imports)

=C + I + G + (X – M)
=$400 + $60 + $120 + ($100 – $120)
=$560 billion

Step 2. To calculate net exports, subtract imports from exports.

Net exports = X – M

=$100 – $120
=–$20 billion

Step 3. To calculate NNP, use the following formula:

NNP = GDP + Income receipts from the rest of the world – Income payments to the rest of the world – Depreciation

=$560 + $10 – $8 – $40
=$522 billion

Try It

These questions allow you to get as much practice as you need, as you can click the link at the top of the first question ("Try another version of these questions") to get a new set of questions. Practice until you feel comfortable doing the questions.

[ohm_question sameseed=1]152054-152055-152056-152057[/ohm_question]

Learning Objectives

[glossary-page][glossary-term]depreciation: [/glossary-term]
[glossary-definition]the process by which capital ages and loses value[/glossary-definition][glossary-term]gross domestic product (GDP): [/glossary-term][glossary-definition]the value of the output of all final goods and services produced within a country in a year[/glossary-definition][glossary-term]gross national product (GNP): [/glossary-term]
[glossary-definition]includes what is produced domestically and what is produced by domestic labor and business abroad in a year[/glossary-definition][glossary-term]national income: [/glossary-term]
[glossary-definition]all income to businesses and individuals[/glossary-definition][glossary-term]net national product (NNP): [/glossary-term]
[glossary-definition]GDP minus depreciation[/glossary-definition]
[glossary-term]personal income: [/glossary-term][glossary-definition]income made by individuals[/glossary-definition] [/glossary-page]

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6.12: Introduction to Nominal and Real GDP

What you'll learn to do: differentiate between nominal GDP and real GDP



Is the standard of living rising, or does it just appear that way? Is an economy producing (and consuming) more goods and services, or does it just look that way because prices are rising? In this section, you will develop a deeper understanding of GDP as you learn how it is measured, both including and excluding the effects of inflation.

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6.13: The Difference Between Nominal and Real Measurements

Learning Objectives

- Contrast nominal measurements and real measurements of economic statistics

Nominal Measurements and Real Measurements

When examining economic statistics, there is a crucial distinction you need to be aware of. The distinction is between nominal and real measurements, which refers to whether or not the measurement has been corrected for inflation. This is important because inflation distorts economic magnitudes, making them look bigger than they really are.



Figure 1. If basketball superstar Michael Jordan made 78.3 million dollars in 1997, but soccer phenomenon Christiano Ronaldo made 93 million dollars in 2017, who made more? In order to find out, you need to adjust for inflation! (The answer is Jordan).

Looking at economic statistics without considering inflation is like looking through a pair of binoculars and trying to guess how close something is: unless you know how strong the lenses are, you cannot guess the distance very accurately. Take GDP for example. If you do not know the inflation rate, it is difficult to figure out if a rise in GDP is due mainly to a rise in the overall level of prices or to a rise in quantities of goods produced.

The **nominal value** of any economic statistic means that we measure the statistic in terms of actual prices that exist at the time. For example, nominal GDP in 2015 is measured as the quantity of each final good and service produced in 2015 times the price at which it was sold in 2015. Similarly, nominal GDP in 2016 is measured using 2016 prices. (If you're thinking "What else would it be," be patient.) If you look at a table or graph of economic data and the label says "billions of dollars," you can be sure that you're looking at nominal data.

The **real value** refers to the same statistic after it has been adjusted for inflation. We will explain the details of how this is done shortly, but for now just know that real values are computed using prices that existed in a single year, say 2015. In other words, real GDP in 2016 is measured as the quantity of each final good and service produced in 2016 times the price *which existed in 2015*. For this reason, real data are sometimes described as "constant dollars" or "2015 dollars." Thus, if you look at a table or graph of economic data and the label says "billions of 2015 dollars," you know that you're looking at real data.

Another way to explore the real value of a good is to compare the prices of goods as percentages of hourly wages across time, as shown in Figure 2. Because this measurement is independent from prices and therefore inflation, it estimates the real cost of goods and services.

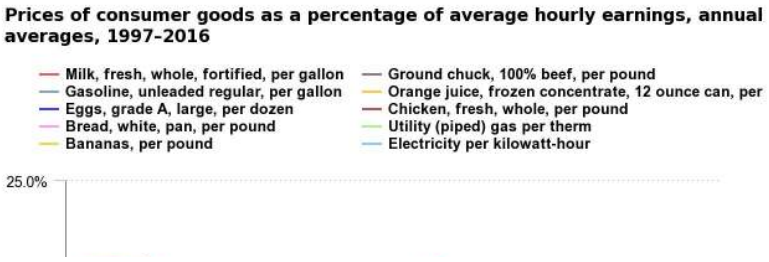
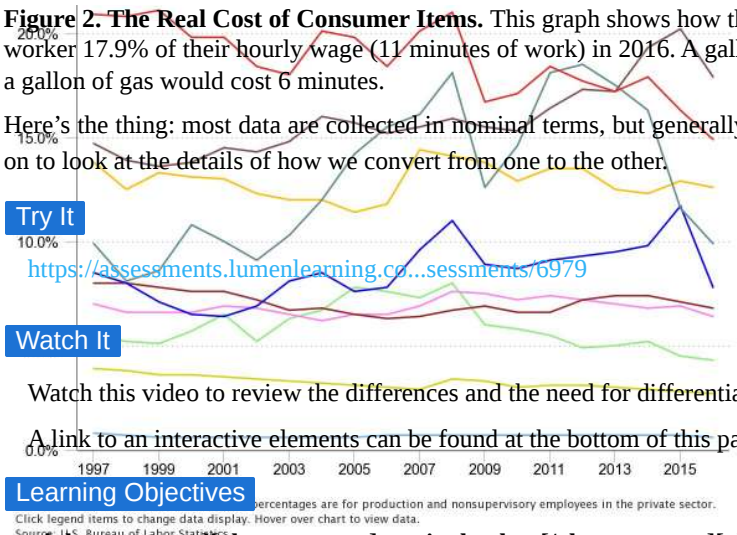


Figure 2. The Real Cost of Consumer Items. This graph shows how the price of ground chuck beef would cost an hourly worker 17.9% of their hourly wage (11 minutes of work) in 2016. A gallon of whole milk would cost 9 minutes of work, and a gallon of gas would cost 6 minutes.

Here's the thing: most data are collected in nominal terms, but generally it is real measurements that are more important. Let's read on to look at the details of how we convert from one to the other.



Try It

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Watch It

Watch this video to review the differences and the need for differentiating between real and nominal GDP.

A link to an interactive elements can be found at the bottom of this page.

Learning Objectives

[glossary-page][glossary-term]nominal value:[/glossary-term][glossary-definition] an economic statistic measured using actual market prices; i.e. nominal values are not adjusted for inflation; contrast with real value[/glossary-definition][glossary-term]real value: [/glossary-term][glossary-definition]an economic statistic measured after it has been adjusted for inflation; contrast with nominal value[/glossary-definition][/glossary-page]

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6.14: Comparing Nominal and Real GDP

Learning Objectives

- Explain and demonstrate the difference between nominal and real GDP

Comparing Nominal and Real GDP

In the last section, we introduced the difference between real measurements and nominal measurements of the same economic statistic. On this page, we explore this challenging, but important, distinction in more depth.

Table 1 shows U.S. GDP at five-year intervals since 1960 in **nominal dollars**; that is, GDP measured using the actual market prices prevailing in each stated year. This data is also reflected in the graph shown in Figure 1.

Table 1. U.S. Nominal GDP (1960-2010)

Year	Nominal GDP (billions of dollars)
1960	543.3
1965	743.7
1970	1,075.9
1975	1,688.9
1980	2,862.5
1985	4,346.7
1990	5,979.6
1995	7,664.0
2000	10,289.7
2005	13,095.4
2010	14,958.3

Source: www.bea.gov, National Accounts

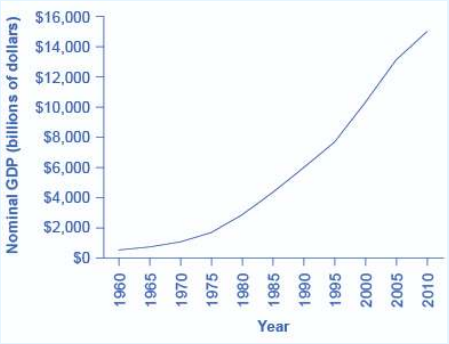


Figure 1. U.S. Nominal GDP, 1960–2010. Nominal GDP values have risen exponentially from 1960 through 2010, according to the BEA.

If an unwary analyst compared nominal GDP in 1960 to nominal GDP in 2010, it might appear that national output had risen by a factor of nearly twenty-seven over this time. This conclusion comes from the **simple growth rate formula** (or percentage change formula):

$$(\text{Final GDP} - \text{Initial GDP}) / \text{Initial GDP} = \text{Growth of Nominal GDP}$$

or

$$(\$14{,}958 - \$543) / \$543 = 2653\%$$

This conclusion, though, would be highly misleading. Recall that **nominal GDP** is defined as the quantity of every final good or service produced multiplied by the price at which it was sold, summed up for all goods and services. In other words, nominal GDP

is the value of output produced:

$$\text{Nominal Value of Output}=\text{Price}\times\text{Quantity of Output}$$

We'll call this the **Real-to-Nominal formula**.

Watch It

Watch this video to see an example of how inflation can distort our perception of GDP. In this example, we focus on a simplified economy with only one good: apples.

A link to an interactive elements can be found at the bottom of this page.

GDP in year one is $1000 and the GDP in year two is $1200. The price for apples in year one was $0.50 per pound, but it rose to $0.55 per pound in year two. We know that the *value* of apple production increased, but we want to determine the extent to which we are producing more apples (i.e. more quantity of goods and services). Since the value of apples is the price of apples times the quantity produced, we can determine the quantity of apples produced in any year by dividing the value of apples in that year (e.g. $1000 in year one) by the price of apples in that year (e.g. $0.50 in year one):

$$\frac{1000}{0.50}=2000\text{ lbs of apples in year one}$$

We can do the same calculation for year two:

$$\frac{1200}{0.55}=2182\text{ lbs of apples in year two}$$

The difference in the number of apples produced is 182 lbs. The growth rate (percentage increase) is

$$\frac{182}{2000}=.091\text{ or }9.1\%$$

Now compare this with the growth in the value of apples:

$$\frac{1200-1000}{1000}=\frac{200}{1000}=0.20\text{ or }20\%$$

So, we appeared to be producing 20% more apples, but in reality we were only producing less than half that or 9.1%.

In sum, nominal GDP was $1000 in year one and $1200 in year two, while real GDP was 2000 lbs of apples in year one and 2182 lbs in year two. To compare these GDPs in dollars, you can look at Year Two's output using Year One's dollar amount. So

2182 lbs x $0.50 = $1091

Year Two's real GDP in dollars is $1091. If prices were held constant, the growth in GDP would have been $91, and not the $200 implied by the nominal GDP.

Nominal output is the value of what's produced, while real output is the quantity of what's produced (in the previous case, pounds of apples). If we produce more apples we can say our real output has increased.

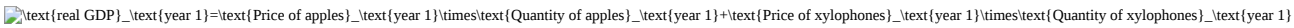
Now suppose our apply economy from above now produces two goods: apples and xylophones.

Year	Price of Apples	Quantity of Apples	Value of Apples	Price of Xylophones	Quantity of Xylophones	Value of Xylophones
Year One	$0.50	2000 lbs	$1,000	$10	100	$1,000
Year Two	$0.55	2182 lbs	$1,200	$12	150	$1,800

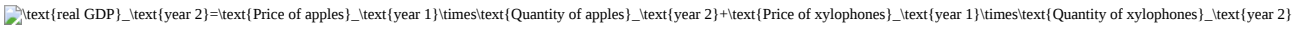
It's easy to compute how much nominal GDP has increased. In year one, the value of apples produced was $1000, and the value of xylophones produced was $1000, so nominal GDP (assuming these are the only two goods in the economy) was $2000. Similarly in year 2, the value of apples produced was $1200, and the value of xylophones produced was $1800, so nominal GDP was $3000. Thus, nominal GDP increased by $1000 (the increase)/$2000 (the nominal GDP in year one)= 50%.

But what has happened to real GDP? Real output of apples has increased from 2000 lbs to 2182 lbs. Real output of xylophones has increased from 100 to 150. How much has real output increased? Can we say that Real GDP has increased from 2100 to 2332 *items*? The answer is no, because it doesn't make sense to add apples & xylophones together, since they are used for different purposes and have different values. What we need is a common denominator, which would allow us to compare apples and xylophones. The common denominator economists use for this purpose is price, since price reflects the value of what something is worth.

Remember that we're using price here as a common denominator to enable us to "add" quantities of apples and xylophones together. But which year's prices should we use? The answer is arbitrary. We can choose the prices from any year as long as we use them with each year's quantities. Suppose we choose the set of prices from year one. We use those prices, both in year one and in year two. Thus, real GDP in year one is

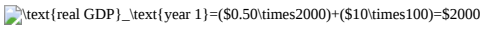


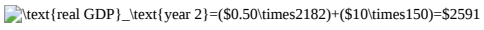
But note that real GDP in year two is



In other words, we compute real GDP in every year using the prices that existed in a single year, in this case year 1. That's why real GDP is often described as being based on "constant dollars" or "year one dollars".

Plugging in the values from the table above, yields:





In other words real GDP increased by $591/$2000 = 29.6%, which is significantly less than the increase in nominal GDP of 50%.

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Why does the distinction between real and nominal GDP matter?

We explained earlier that nominal measures are distorted by the effects of inflation. Thus, nominal GDP inflates the actual quantity of goods and services produced (i.e. real GDP) making it look bigger than it really is. Let's think of this another way. Real GDP is highly correlated with employment and the standard of living. When real GDP increases, we tend to have more jobs and more goods and services to consume. When businesses need to produce more goods and services, they typically need to hire more workers, which means incomes are up. By contrast, when inflation drives nominal GDP up, there may be no effect on jobs and the standard of living. If businesses are producing the same quantity of goods and services, they don't need to hire more workers. The same quantity of things just cost more.

Learning Objectives

[glossary-page][glossary-term]nominal value:[/glossary-term]
[glossary-definition] an economic statistic measured using actual market prices; i.e. nominal values are not adjusted for inflation; contrast with real value[/glossary-definition][glossary-term]real-to-nominal formula: [/glossary-term][glossary-definition]the nominal value of some economic variable (e.g. GDP) is the price level times the real value of that economic variable.[/glossary-definition][glossary-term] real value: [/glossary-term][glossary-definition]an economic statistic measured using prices that existed in an earlier year (or period); real values have been adjusted for inflation since that earlier year; contrast with nominal value[/glossary-definition][glossary-term]simple growth rate formula: [/glossary-term][glossary-definition]the growth rate (or percentage change) of any variable X over time is (the value of X in the final period – the value of X in the initial period)/(the value of X in the initial period)[/glossary-definition][/glossary-page]

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6.15: Converting Nominal to Real GDP

Learning Objectives

- Calculate real GDP based on nominal GDP values
- Calculate the real growth rate in GDP

Now we're in a position to answer the question that we posed previously: given nominal GDP for the U.S. economy from 1960-2010, how much did real GDP actually increase?

In order to see how much production has actually increased, we need to extract the effects of higher prices on nominal GDP, so that what we're left with is real GDP, the increase in the quantity of goods and services produced. This can be easily done using a concept known as the GDP deflator. The **GDP deflator** is a price index measuring the average price of all goods and services included in the economy. We will explore price indices in detail and how they are computed when we learn more about inflation, but this definition will do for now. The data for the GDP deflator are given in Table 1 and shown graphically in Figure 1.

Table 1. U.S. GDP Deflator, 1960-2010

1960	19.0

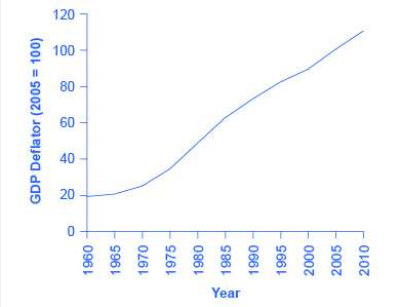


Figure 1. U.S. GDP Deflator, 1960–2010. Much like nominal GDP, the GDP deflator has risen exponentially from 1960 through 2010. (Source: BEA).

1965 20.3 1970 24.8 1975 34.1 1980 48.3 1985 62.3 1990 72.7 1995 81.7 2000 89.0 2005 100.0 2010 110.0
Source: www.bea.gov, National Accounts

Figure 1 shows that the price level, as measured by the GDP deflator, has risen dramatically since 1960. Using the simple growth rate formula that we explained on the last page, we see that the price level in 2010 was almost six times higher than in 1960 (the deflator for 2010 was 110 versus a level of 19 in 1960). Clearly, much of the apparent growth in nominal GDP was due to inflation, not an actual change in the quantity of goods and services produced, in other words, not in real GDP. Recall that nominal GDP can rise for two reasons: an increase in output, and/or an increase in prices. What is needed is to extract the increase in prices from nominal GDP so as to measure *only changes in output*. After all, the dollars used to measure nominal GDP in 1960 are worth more than the inflated dollars of 1990—and the price index tells exactly how much more. This adjustment is easy to do if you use the Nominal-to-Real formula that we explained previously:

$$\text{Nominal Value of Output} = \text{Price} \times \text{Quantity of Output}$$

Taking the GDP form of this equation:

$$\text{Nominal GDP} = \text{GDP Deflator} \times \text{Real GDP}$$

Divide both sides by the GDP Deflator:

$$\text{Real GDP} = \frac{\text{Nominal GDP}}{\text{GDP Deflator}}$$

For reasons that will be explained in more detail below, mathematically, a price index (like the GDP Deflator) is a two-digit decimal number like 1.00 or 0.85 or 1.25. Because some people have trouble working with decimals, when the price index is published, it has traditionally been multiplied by 100 to get integer numbers like 100, 85, or 125. What this means is that when we "deflate" nominal figures to get real figures (by dividing the nominal by the price index), we also need to remember to divide the published price index by 100 to make the math work. So the formula becomes:



Computing Real GDP

Let's practice finding real GDP by looking at the actual data on nominal GDP and the GDP deflator.

Table 2. U.S. Nominal GDP and the GDP Deflator

Year	Nominal GDP (billions of dollars)	GDP Deflator (2005 = 100)
1960	543.3	19.0
1965	743.7	20.3
1970	1,075.9	24.8
1975	1,688.9	34.1
1980	2,862.5	48.3
1985	4,346.7	62.3
1990	5,979.6	72.7
1995	7,664.0	81.7
2000	10,289.7	89.0
2005	13,095.4	100.0
2010	14,958.3	110.0

Source: www.bea.gov

Step 1. Look at Table 2 to see that, in 1960, nominal GDP was $543.3 billion and the price index (GDP deflator) was 19.0.

Step 2. To calculate the real GDP in 1960, use the formula:



We'll do this in two parts to make it clear. First adjust the price index: 19 divided by . Then divide into nominal GDP:

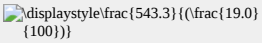
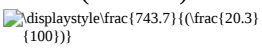
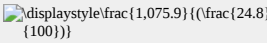
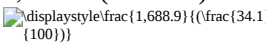
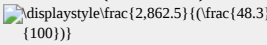
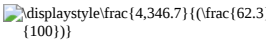
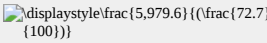
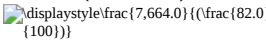
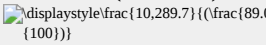
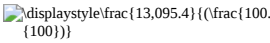
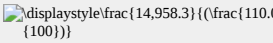
$$\frac{\$543.3 \text{ billion}}{0.19} = \$2,859.5 \text{ billion} \tag{6.15.1}$$

Step 3. Use the same formula to calculate the real GDP in 1965.



Step 4. Continue using this formula to calculate all of the real GDP values from 1960 through 2010. The calculations and the results are shown in Table 3.

Table 3. Converting Nominal to Real GDP

Year	Nominal GDP (billions of dollars)	GDP Deflator (2005 = 100)	Calculations	Real GDP (billions of 2005 dollars)
1960	543.3	19.0		[reveal-answer q="263334"]Show Answer[/reveal-answer] [hidden-answer a="263334"]2859.5[/hidden-answer]
1965	743.7	20.3	743.7 / (20.3/100) 	[reveal-answer q="291567"]Show Answer[/reveal-answer] [hidden-answer a="291567"]3663.5[/hidden-answer]
1970	1075.9	24.8	1,075.9 / (24.8/100) 	[reveal-answer q="136030"]Show Answer[/reveal-answer] [hidden-answer a="136030"]4338.3[/hidden-answer]
1975	1688.9	34.1	1,688.9 / (34.1/100) 	[reveal-answer q="663136"]Show Answer[/reveal-answer] [hidden-answer a="663136"]4952.8[/hidden-answer]
1980	2862.5	48.3	2,862.5 / (48.3/100) 	[reveal-answer q="867653"]Show Answer[/reveal-answer] [hidden-answer a="867653"]5926.5[/hidden-answer]
1985	4346.7	62.3	4,346.7 / (62.3/100) 	[reveal-answer q="144038"]Show Answer[/reveal-answer] [hidden-answer a="144038"]6977.0[/hidden-answer]
1990	5979.6	72.7	5,979.6 / (72.7/100) 	[reveal-answer q="400067"]Show Answer[/reveal-answer] [hidden-answer a="400067"]8225.0[/hidden-answer]
1995	7664.0	82.0	7,664 / (82.0/100) 	[reveal-answer q="270476"]Show Answer[/reveal-answer] [hidden-answer a="270476"]9346.3[/hidden-answer]
2000	10289.7	89.0	10,289.7 / (89.0/100) 	[reveal-answer q="884559"]Show Answer[/reveal-answer] [hidden-answer a="884559"]11561.5[/hidden-answer]
2005	13095.4	100.0	13,095.4 / (100.0/100) 	[reveal-answer q="715061"]Show Answer[/reveal-answer] [hidden-answer a="715061"]13095.4[/hidden-answer]
2010	14958.3	110.0	14,958.3 / (110.0/100) 	[reveal-answer q="793293"]Show Answer[/reveal-answer] [hidden-answer a="793293"]13598.5[/hidden-answer]

Source: Bureau of Economic Analysis, www.bea.gov

There are a couple things to notice here. Whenever you compute a real statistic, one year (or period) plays a special role. It is called the base year (or base period). The base year is the year whose prices are used to compute the real statistic (as we showed on the last page). When we calculate real GDP, for example, we take the quantities of goods and services produced in each year (for example, 1960 or 1973) and multiply them by their prices in the base year (in this case, 2005), so we get a measure of GDP that uses prices that do not change from year to year. That is why real GDP is labeled “Constant Dollars” or “2005 Dollars,” which means that real GDP is constructed using prices that existed in 2005. The formula used is:

$$\displaystyle\text{GDP deflator}=\frac{\text{Nominal GDP}}{\text{Real GDP}}\times{100}$$

Rearranging the formula and using the data from 2005:

$$\begin{array}{l}\text{Real GDP}=\frac{\text{Nominal GDP}}{\frac{\text{Price Index}}{100}}\\\\\text{Real GDP}=\frac{13,095.4\text{ billion}}{\frac{100}{100}}=\$13,095.4\text{ billion}\end{array}$$

Comparing real GDP and nominal GDP for 2005, you see they are the same. This is no accident. It is because 2005 has been chosen as the “base year” in this example. Since the price index in the base year always has a value of 100 (by definition), nominal and real GDP are always the same in the base year. Look at the data for 2010.

$$\begin{array}{l}\text{Real GDP}=\frac{\text{Nominal GDP}}{\frac{\text{Price Index}}{100}}\\\\\text{Real GDP}=\frac{14,958.3\text{ billion}}{\frac{100}{100}}=\$13,598.5\text{ billion}\end{array}$$

Use this data to make another observation: As long as inflation is positive, meaning prices increase on average from year to year, real GDP should be less than nominal GDP in any year after the base year. The reason for this should be clear: The value of nominal GDP is “inflated” by inflation. Similarly, as long as inflation is positive, real GDP should be greater than nominal GDP in any year before the base year.

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Figure 2 shows the U.S. nominal and real GDP since 1960. Because 2005 is the base year, the nominal and real values are exactly the same in that year. However, over time, the rise in nominal GDP looks much larger than the rise in real GDP (that is, the nominal GDP line rises more steeply than the real GDP line), because the rise in nominal GDP is exaggerated by the presence of inflation, especially in the 1970s.

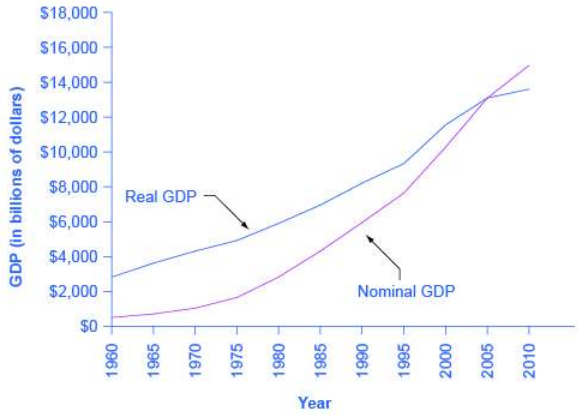


Figure 2. U.S. Nominal and Real GDP, 1960–2012. The red line measures U.S. GDP in nominal dollars. The black line measures U.S. GDP in real dollars, where all dollar values have been converted to 2005 dollars. Since real GDP is expressed in 2005 dollars, the two lines cross in 2005. However, real GDP will appear higher than nominal GDP in the years before 2005, because dollars were worth less in 2005 than in previous years. Conversely, real GDP will appear lower in the years after 2005, because dollars were worth more in 2005 than in later years.

Let’s return to the question posed originally: How much did GDP increase in real terms? What was the rate of growth of real GDP from 1960 to 2010? To find the real growth rate, we apply the formula for percentage change:

$$\displaystyle\frac{2010\text{ real GDP}-1960\text{ real GDP}}{1960\text{ real GDP}}\times{100}=\text{ percent change}$$

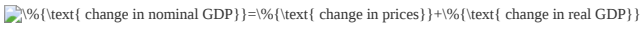
$$\displaystyle\frac{13,598.5-2,859.5}{2,859.5}\times{100}=376\text{ percent}$$

In other words, the U.S. economy has increased real production of goods and services by nearly a factor of four (i.e. 376%) since 1960. Of course, that understates the material improvement since it fails to capture improvements in the quality of products and the invention of new products.

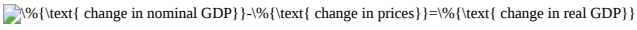
For short periods of time, there is a quicker way to answer this question approximately, using another math trick. Remember that nominal GDP increases for two reasons, first, because prices increase and second because real GDP increases. In other words the

percentage increase in nominal GDP is (approximately) equal to the percentage increase in prices plus the percentage increase in real GDP.

Expressing this as an equation,



Subtracting % change in prices from both sides gives:



Therefore, the growth rate (percent change) of real GDP equals the growth rate in nominal GDP (% change in value) minus the growth rate in prices (% change in GDP Deflator).

Two Ways to Calculate Growth Rates

Let's look at the bottom numbers from the following table:

Year	Nominal GDP	GDP Deflator	Real GDP
2005	$13095.4	100	$13095.4
2010	$14958.3	110	$13598.5

Method 1: Using the Simple Growth Rate formula

(Real GDP in 2010 – Real GDP in 2005) / Real GDP in 2005 = Growth of Real GDP

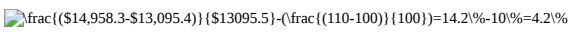
Plugging in the numbers gives

($13,598.5- $13,095.4) / $13,095.5 = 4%

Method 2: Using the Math Trick

Growth of Nominal GDP – Growth of GDP Deflator = Growth of Real GDP

Plugging in the numbers and using the Simple Growth Rate formula gives



Note that Method 2 is only a quick approximation to Method 1.

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6.16: Learn By Doing- Comparing Nominal and Real GDP

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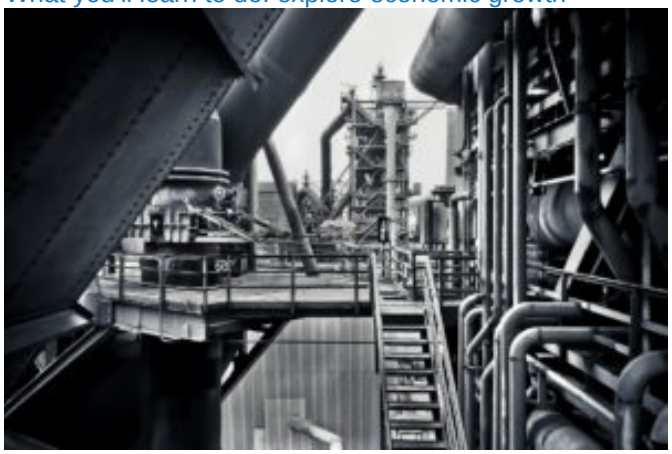
These questions allow you to get as much practice as you need, as you can click the link at the top of the first question ("Try another version of these questions") to get a new set of questions. Practice until you feel comfortable doing the questions.

[ohm_question sameseed=1]152059-152060-152061-152062-152064-152065-152066-152067-152068-152069-152070-152071-152072-152073[/ohm_question]

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6.17: Introduction to Economic Growth

What you'll learn to do: explore economic growth



Over time, real GDP increases. Some years it increases faster than average. Some years it increases slower than average. Some years GDP declines. These waves of peaks and troughs are describe as the business cycle.

In this section, we will explore economic growth**,** which is the increase in economic activity that occurs over the long term. We measure economic growth by real GDP per capita, but growth is a broader collection of social and economic changes, which lead to an increase in the standard of living.

You'll see why growth happened rapidly following the Industrial Revolution, and why growth remains important today. You will also determine what factors lead to improvements in standards of living.

Try It

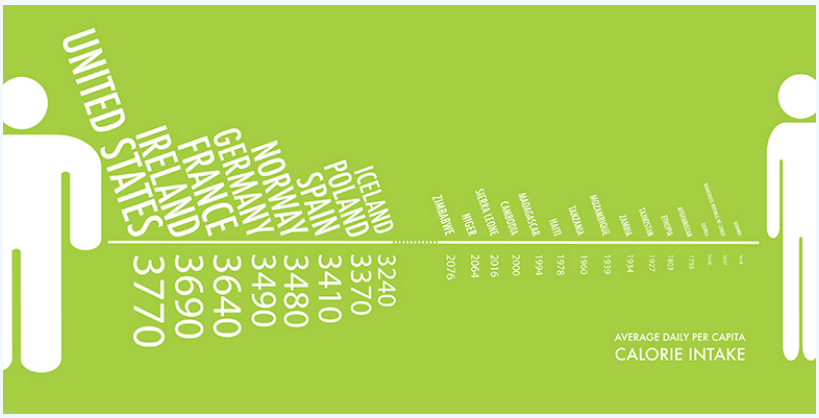


Figure 1. Average Daily Calorie Consumption. Not only has the number of calories consumed per day increased, so has the amount of food calories that people are able to afford based on their working wages. (Credit: modification of work by Lauren Manning/Flickr Creative Commons).

On average, humans need about 2,500 calories a day to survive, depending on height, weight, and gender. The economist Brad DeLong estimates that the average worker in the early 1600s earned wages that could afford him 2,500 food calories. This worker lived in Western Europe. Two hundred years later, that same worker could afford 3,000 food calories. However, between 1800 and 1875, just a time span of just 75 years, economic growth was so rapid that western European workers could purchase 5,000 food calories a day. By 2012, a low skilled worker in an affluent Western European/North American country could afford to purchase 2.4 million food calories per day.

What caused such a rapid rise in living standards between 1800 and 1875 and thereafter? Why is it that many countries, especially those in Western Europe, North America, and parts of East Asia, can feed their populations more than adequately, while others cannot? We will look at these and other questions as we examine long-run economic growth.

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6.18: Business Cycles

Learning Objectives

- Explain business cycles, including recessions, depressions, peaks, and troughs

Tracking Real GDP Over Time

When news reports indicate that "the economy grew 1.2% in the first quarter," the reports are referring to the percentage change in real GDP. By convention, GDP growth is reported at an annualized rate: whatever the calculated growth in real GDP was for the quarter, it is multiplied by four when it is reported as if the economy were growing at that rate for a full year.

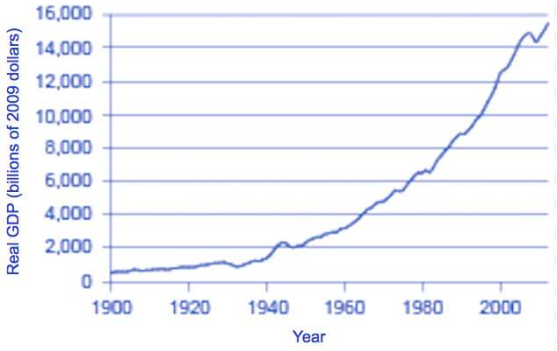


Figure 1. U.S. GDP, 1900–2016. Real GDP in the United States in 2016 (in 2009 dollars) was about $16.7 trillion. After adjusting to remove the effects of inflation, this represents a roughly 20-fold increase in the economy's production of goods and services since the start of the twentieth century. (Source: bea.gov)

Figure 1 shows the pattern of U.S. real GDP since 1900. The generally upward long-term path of GDP has been regularly interrupted by short-term declines. A significant decline in real GDP is called a **recession**. Recessions typically last at least six months (or two quarters). An especially lengthy and deep recession is called a **depression**. The severe drop in GDP that occurred during the Great Depression of the 1930s is clearly visible in the figure, as is the Great Recession of 2008–2009.

Real GDP is important because it is highly correlated with other measures of economic activity, like employment and unemployment. When real GDP rises, so does employment.

The most significant human problem associated with recessions (and their larger, uglier cousins, depressions) is that a slowdown in production means that firms need to lay off or fire some of the workers they have. Losing a job imposes painful financial and personal costs on workers, and often on their extended families as well. In addition, even those who keep their jobs are likely to find that wage raises are scanty at best—they may even be asked to take pay cuts or work reduced hours.

Table 1 lists the pattern of recessions and expansions in the U.S. economy since 1900. The highest point of the economy, before the recession begins, is called the **peak**; conversely, the lowest point of a recession, before a recovery begins, is called the **trough**. Thus, a recession lasts from peak to trough, and an economic upswing runs from trough to peak. The movement of the economy from peak to trough and trough to peak is called the **business cycle**. It is intriguing to notice that the three longest trough-to-peak expansions of the twentieth century have happened since 1960. The most recent recession started in December 2007 and ended formally in June 2009. This was the most severe recession since the Great Depression of the 1930s.

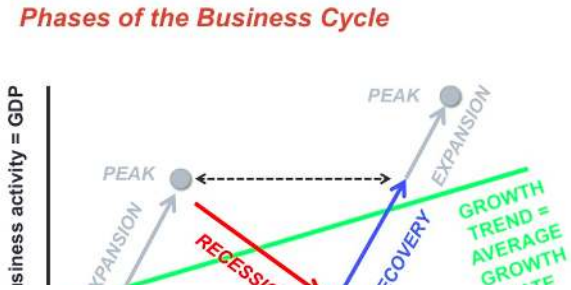


Figure 2. The Business Cycle. This is an example of a typical business cycle showing expansion, recession, then recovery. The growth trend is the average growth rate over time.

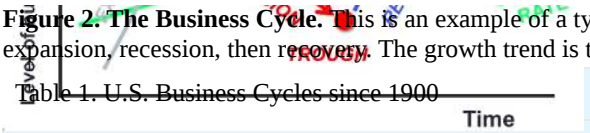


Table 1. U.S. Business Cycles since 1900

Trough	Peak	Months of Contraction	Months of Expansion
December 1900	September 1902	18	21
August 1904	May 1907	23	33
June 1908	January 1910	13	19
January 1912	January 1913	24	12
December 1914	August 1918	23	44
March 1919	January 1920	7	10
July 1921	May 1923	18	22
July 1924	October 1926	14	27
November 1927	August 1929	23	21
March 1933	May 1937	43	50
June 1938	February 1945	13	80
October 1945	November 1948	8	37
October 1949	July 1953	11	45
May 1954	August 1957	10	39
April 1958	April 1960	8	24
February 1961	December 1969	10	106
November 1970	November 1973	11	36
March 1975	January 1980	16	58
July 1980	July 1981	6	12
November 1982	July 1990	16	92
March 2001	November 2001	8	120
December 2007	June 2009	18	73

Source: http://www.nber.org/cycles/main.html

A private think tank, the *National Bureau of Economic Research*, is the official tracker of business cycles for the U.S. economy. However, the effects of a severe recession often linger on after the official ending date assigned by the NBER.

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Watch It

Watch this short video for another explanation of business cycles.

A link to an interactive elements can be found at the bottom of this page.

Business Cycle Vocabulary

Other terminology to know in relation to the ebbs and flows of the business cycle include:

- **Overheating**, which means the economy is picking up speed leading to increased inflation. It occurs when its productive capacity is unable to keep pace with growing aggregate demand. It is generally characterized by an above-trend rate of economic growth, where growth is occurring at an unsustainable rate. Boom periods are often characterized by overheating in the economy.
- **Stagflation**, which means the simultaneous occurrence of stagnant growth (or recession) and inflation. It is a situation where the inflation rate is high, the economic growth rate slows down, and unemployment is also high. It raises a dilemma for economic policy since actions designed to lower inflation may exacerbate unemployment, and vice versa.

Learning Objectives

[/glossary-page]

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6.19: GDP and Standard of Living

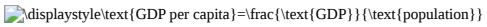
Learning Objectives

- Calculate GDP per capita using population data
- Explain the limitations of GDP as a measure of the standard of living

When economists talk about the **standard of living**, they are referring to the average quantity (and quality) of goods and services that people in a country can afford to consume. Since real GDP measures the quantity of goods and services produced, it is common to use **GDP per capita**, that is real GDP divided by population, as a measure of economic welfare or standard of living in a nation.

GDP Per Capita

The U.S. economy has the largest GDP in the world, by a considerable amount. The United States is also a populous country; in fact, it is the third largest country by population in the world, although well behind China and India. So is the U.S. economy larger than other countries just because the United States has more people than most other countries, or because the U.S. economy is actually larger on a per-person basis? This question can be answered by calculating a country's GDP per capita; that is, the GDP divided by the population.



The second column of Table 1 lists the GDP of several countries, showing their GDP as converted into U.S. dollars. The third column gives the population for each country. The fourth column lists the GDP per capita. GDP per capita is obtained in two steps: first, by dividing column two (GDP, in billions of dollars) by 1000 so it has the same units as column three (Population, in millions), then dividing the result (GDP in millions of dollars) by column three (population, in millions).

Table 1. GDP Per Capita, 2013(Source: http://www.imf.org/external/pubs/ft/...ata/index.aspx)

Country	GDP (in billions of U.S. dollars)	Population (in millions)	Per Capita GDP (in U.S. dollars)
Brazil	2,246.00	199.20	11,172.50
Canada	1,826.80	35.10	52,037.10
China	9,469.10	1,360.80	6,958.70
Egypt	271.40	83.70	3,242.90
Germany	3,636.00	80.80	44,999.50
India	1,876.80	1,243.30	1,509.50
Japan	4,898.50	127.3	38,467.80
Mexico	1,260.90	118.40	10,649.90
South Korea	1,304.47	50.20	25,975.10
United Kingdom	2,523.20	64.10	39,371.70
United States	16,768.10	316.30	53,001.00

Notice that the ranking by GDP is different from the ranking by GDP per capita. India has a somewhat larger GDP than Germany, but on a per capita basis, Germany has more than 10 times India's standard of living. Will China soon have a better standard of living than the U.S.? Read the following Clear It Up feature to find out.

Try It

As shown in Table 1, China has the second largest GDP of the countries: $9.5 trillion compared to the United States' $16.8 trillion. Perhaps it will surpass the United States, but probably not any time soon. China has a much larger population so that in per capita terms, its GDP is less than one fifth that of the United States ($6,958.70 compared to $53,001). The Chinese people are still quite poor relative to the United States and other developed countries. One caveat: For reasons to be discussed shortly, GDP per capita can give us only a rough idea of the differences in living standards across countries.

The high-income nations of the world—including the United States, Canada, the Western European countries, and Japan—typically have GDP per capita in the range of $20,000 to $50,000. Middle-income countries, which include much of Latin America, Eastern Europe, and some countries in East Asia, have GDP per capita in the range of $6,000 to $12,000. The low-income countries in the world, many of them located in Africa and Asia, often have GDP per capita of less than $2,000 per year.

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Limitations of GDP as a Measure of the Standard of Living

The level of GDP per capita clearly captures some of what we mean by the phrase "standard of living." Most of the migration in the world, for example, involves people who are moving from countries with relatively low GDP per capita to countries with relatively high GDP per capita.

"Standard of living," though, is a broader term than GDP per capita. While GDP focuses on production that is bought and sold in markets, standard of living includes all elements that affect people's well-being, whether they are market transactions or not. To illuminate the gap between GDP and standard of living, it is useful to spell out some things that GDP does not cover that are clearly relevant to standard of living.

While GDP includes spending on recreation and travel, it does not cover leisure time. Clearly, however, there is a substantial difference between an economy that is large because people work long hours, and an economy that is just as large because people are more productive with their time so they do not have to work as many hours. The GDP per capita of the U.S. economy is larger than the GDP per capita of Germany, as was shown in Table 1, but does that prove that the standard of living in the United States is higher? Not necessarily, since it is also true that the average U.S. worker works several hundred hours more per year more than the average German worker. The calculation of GDP does not take the German worker's extra weeks of vacation into account.

While GDP includes what is spent on environmental protection, healthcare, and education, it does not include actual levels of environmental cleanliness, health, and learning. GDP includes the cost of buying pollution-control equipment, but it does not address whether the air and water are actually cleaner or dirtier. GDP includes spending on medical care, but does not address whether life expectancy or infant mortality have risen or fallen. Similarly, it counts spending on education, but does not address directly how much of the population can read, write, or do basic mathematics.

GDP includes production that is exchanged in the market, but it does not cover production that is not exchanged in the market. For example, hiring someone to mow your lawn or clean your house is part of GDP, but doing these tasks yourself is not part of GDP. One remarkable change in the U.S. economy in recent decades is that, as of 1970, only about 42% of women participated in the paid labor force. By the second decade of the 2000s, nearly 60% of women participated in the paid labor force according to the Bureau of Labor Statistics. As women are now in the labor force, many of the services they used to produce in the non-market economy like food preparation and child care have shifted to some extent into the market economy, which makes the GDP appear larger even if more services are not actually being consumed.

GDP has nothing to say about the level of inequality in society. GDP per capita is only an average. When GDP per capita rises by 5%, it could mean that GDP for everyone in the society has risen by 5%, or that of some groups has risen by more while that of others has risen by less—or even declined. GDP also has nothing in particular to say about the amount of variety available. If a family buys 100 loaves of bread in a year, GDP does not care whether they are all white bread, or whether the family can choose from wheat, rye, pumpernickel, and many others—it just looks at whether the total amount spent on bread is the same.

Likewise, GDP has nothing much to say about what technology and products are available. The standard of living in, for example, 1950 or 1900 was not affected only by how much money people had—it was also affected by what they could buy. No matter how much money you had in 1950, you could not buy an iPhone or a personal computer.

In certain cases, it is not clear that a rise in GDP is even a good thing. If a city is wrecked by a hurricane, and then experiences a surge of rebuilding construction activity, it would be peculiar to claim that the hurricane was therefore economically beneficial. If people are led by a rising fear of crime, to pay for installation of bars and burglar alarms on all their windows, it is hard to believe that this increase in GDP has made them better off. In that same vein, some people would argue that sales of certain goods, like pornography or extremely violent movies, do not represent a gain to society's standard of living.

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Watch It!

Watch this video to learn more about how GDP is used to gauge economic productivity and what other measures are useful in examining a nation's economic growth.

A link to an interactive elements can be found at the bottom of this page.

Learning Objectives

[glossary-page][glossary-term]GDP per capita:[/glossary-term]
[glossary-definition] GDP divided by the population; often used as a measure of standard of living[/glossary-definition]
[glossary-term]standard of living: [/glossary-term][glossary-definition]all elements that affect people's happiness, whether these elements are obtained through market transactions or not[/glossary-definition][/glossary-page]

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6.20: Labor Productivity and Economic Growth

Learning Objectives

- Describe factors that contribute to labor productivity
- Analyze the sources of economic growth using the aggregate production function

Labor Productivity and Economic Growth

Sustained long-term economic growth comes from increases in worker productivity, which essentially means how well we do things. In other words, how efficiently does a nation use its workers and other resources? **Labor productivity** is the output that each employed person creates per unit of his or her time. The easiest way to understand labor productivity is to imagine a Canadian worker who can make 10 loaves of bread in an hour versus a U.S. worker who in the same hour can make only two loaves of bread. In this fictional example, the Canadians are more productive. Being more productive essentially means you can do more in the same amount of time. This in turn frees up resources to be used elsewhere.

What determines how productive workers are? The answer is pretty intuitive. The main determinants of labor productivity are physical capital, human capital, and technological change. These can also be viewed as key components of economic growth.

Physical capital can be thought of as the tools workers have to work with. More formally, **physical capital** includes the plant and equipment used by firms but also **infrastructure,** things like roads and other components of transportation networks that contribute to the economy. Infrastructure is provided by governments. Again, greater physical capital implies more output. Physical capital can affect productivity in two ways: (1) an increase in the *quantity* of physical capital (for example, more computers of the same quality); and (2) an increase in the *quality* of physical capital (same number of computers but the computers are faster, and so on). **Human capital** is the accumulated knowledge (from education and experience), skills, and expertise that the average worker in an economy possesses. Typically the higher the average level of education in an economy, the higher the accumulated human capital and the higher the labor productivity. Human capital and physical capital accumulation are similar: in both cases, investment now pays off in longer-term productivity in the future.

Another factor that determines labor productivity is technology. **Technological change** is a combination of **invention**—advances in knowledge—and **innovation**, which is putting that advance to use in a new product or service. For example, the transistor was invented in 1947. It allowed us to miniaturize the footprint of electronic devices and use less power than the tube technology that came before it. Innovations since then have produced smaller and better transistors that that are ubiquitous in products as varied as smart-phones, computers, and escalators. The development of the transistor has allowed workers to be anywhere with smaller devices. These devices can be used to communicate with other workers, measure product quality or do any other task in less time, improving worker productivity.

When most people think of new technology, the invention of new products like the laser, the smartphone, or some new wonder drug come to mind. In food production, the development of more drought-resistant seeds is another example of technology. Technology, as economists use the term, however, includes still more. It includes new ways of organizing work, like the invention of the assembly line, new methods for ensuring better quality of output in factories, and innovative institutions that facilitate the process of converting inputs into output. In short, technology comprises all the advances that make the existing machines and other inputs produce more, and at higher quality, as well as altogether new products.

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The Aggregate Production Function

We can formalize these ideas by introducing the concept of the the aggregate production function. A **production function** is the process of turning economic inputs like labor, machinery, and raw materials into outputs like goods and services used by consumers. A microeconomic production function describes the relation between the inputs and outputs of a firm, or perhaps an industry. In macroeconomics, the **aggregate production function** is the relationship between all the inputs in the economy and GDP.

Components of the Aggregate Production Function

Figure 1 shows an example of the aggregate production function.



Figure 1. Aggregate Production Function. An aggregate production function shows what goes into producing the output for an overall economy.

We are already familiar with the idea of an aggregate production function—it is the concept behind the production possibilities frontier. Remember, the PPF shows the maximum quantities of goods and services a nation can produce given the resources it has available. The aggregate production function determines those maximum quantities. Economic growth is illustrated by an increase in the production possibilities frontier, which we show in Figure 2, below.

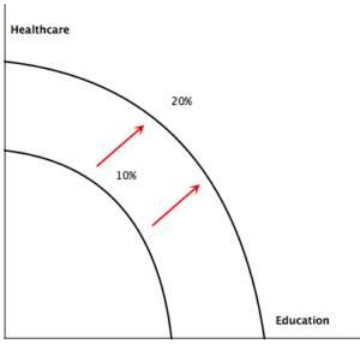


Figure 1. Economic growth pushes out the production possibility frontier.

The inner PPF corresponds to the maximum GDP obtainable given the resources available in 2010. The outer PPF shows the maximum GDP obtainable given the resources available in 2010. Economic growth is illustrated by the outward shift in the PPF.

What causes economic growth then? It must be increases in physical or human capital, or technological improvements.

Try It

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Economic Growth and the Standard of Living

We indicated that economists often use real GDP per capita as a proxy for the standard of living. We can examine how the standard of living improves over time by looking at the aggregate *per capita* production function, shown below in Figure 3. The aggregate per capita production function is very similar to the aggregate production function, except that all elements are divided by the population. The inputs are the average level of human capital per person, the average level of physical capital per person, and the level of technology per person. Increases in the quantities of physical capital, human capital and technology per person lead to a higher standard of living over time.

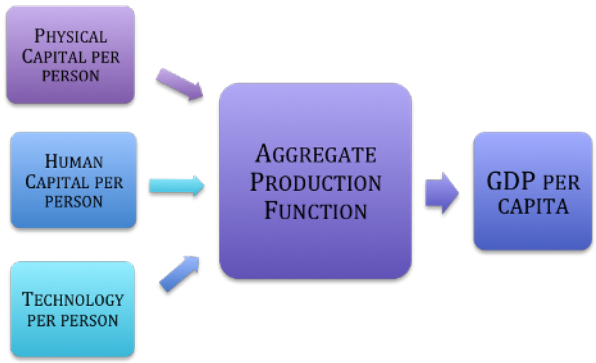


Figure 3. Aggregate Per Capita Production Function.

Learning Objectives

[glossary-page][glossary-term]aggregate per capita production function: [/glossary-term]
[glossary-definition]aggregate production function expressed in per capita terms: inputs including physical capital per person, human capital per person, and technology per person are transformed into output measured as GDP per capita[/glossary-definition][glossary-term]aggregate production function: [/glossary-term][glossary-definition]the process whereby an economy as a whole turns economic inputs such as human capital, physical capital, and technology into output measured as GDP [/glossary-definition][glossary-term]human capital: [/glossary-term][glossary-definition]the accumulated skills and education of workers[/glossary-definition][glossary-term]innovation:[/glossary-term][glossary-definition] putting advances in knowledge to use in a new product or service [/glossary-definition][glossary-term]invention: [/glossary-term][glossary-definition]advances in knowledge[/glossary-definition][glossary-term]labor productivity: [/glossary-term][glossary-definition]quantity of output produced per worker, or per hour worked (sometimes called worker productivity)[/glossary-definition][glossary-term]production function: [/glossary-term][glossary-definition]the process whereby a firm turns economic inputs like labor, machinery, and raw materials into outputs like goods and services used by consumers[/glossary-definition][glossary-term]technological change:[/glossary-term][glossary-definition] a combination of invention—advances in knowledge—and innovation[/glossary-definition][/glossary-page]

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6.21: Measuring Productivity and Growth Rates

Learning Objectives

- Measure productivity in an economy
- Explain capital deepening and its significance
- Analyze growth accounting studies and the lessons learned from these studies

Measuring Productivity

An economy's rate of productivity growth is closely linked to the growth rate of its GDP per capita, although the two are not identical. For example, if the percentage of the population who holds jobs in an economy increases, GDP per capita will increase but the productivity of individual workers may not be affected. Over the long term, the only way that GDP per capita can grow continually is if the productivity of the average worker rises.

A common measure of U.S. productivity per worker is the dollar value per hour the worker contributes to the employer's output. This measure excludes government workers, because their output is not sold in the market and so their productivity is hard to measure. It also excludes farming, which accounts for only a relatively small share of the U.S. economy. Figure 1 shows that the average amount produced by a U.S. worker in an hour averaged over $100 in 2011, more than twice the amount an average worker produced per hour in 1966.

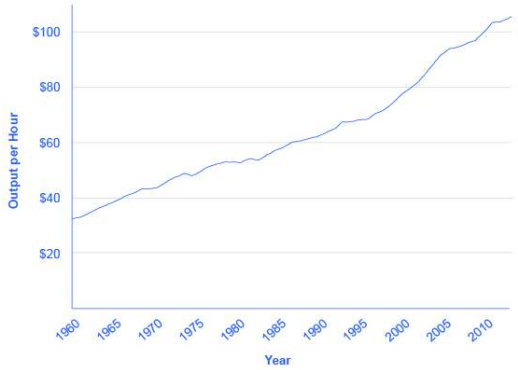


Figure 1.Output per Hour Worked in the U.S. Economy, 1947–2011. In the U.S. economy, worker productivity rose more quickly in the 1960s and the mid-1990s compared with the 1970s and 1980s. However, these growth-rate differences are only a few percentage points per year. Look carefully to see them in the changing slope of the line. The average U.S. worker produced nearly $105 per hour in 2012. (Source: U.S. Department of Labor, Bureau of Labor Statistics.)

According to the Department of Labor, U.S. productivity growth was fairly strong in the 1950s but then declined in the 1970s and 1980s before rising again in the second half of the 1990s and the first half of the 2000s. In fact, the rate of productivity measured by the change in output per hour worked averaged 3.2% per year from 1950 to 1970; dropped to 1.9% per year from 1970 to 1990; and then climbed back to over 2.3% from 1991 to the present, with another modest slowdown after 2001. Figure 2 shows average annual rates of productivity growth averaged over time since 1950.

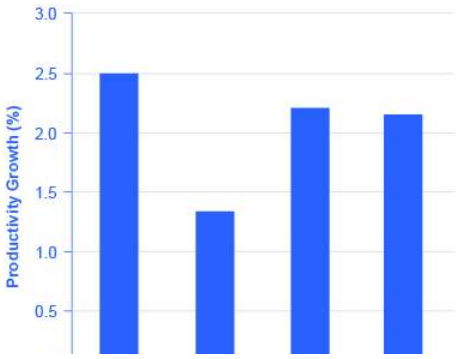




Figure 2. Productivity Growth Since 1950. U.S. growth in worker productivity was very high between 1950 and 1970. It then declined to lower levels in the 1970s and the 1980s. The late 1990s and early 2000s saw productivity rebound, but then productivity sagged a bit in the 2000s. Some think the productivity rebound of the late 1990s and early 2000s marks the start of a "new economy" built on higher productivity growth, but this cannot be determined until more time has passed. (Source: U.S. Department of Labor, Bureau of Labor Statistics.)

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In recent years a controversy has been brewing among economists about the resurgence of U.S. productivity in the second half of the 1990s. One school of thought argues that the United States had developed a "new economy" based on the extraordinary advances in communications and information technology of the 1990s. The most optimistic proponents argue that it would generate higher average productivity growth for decades to come. The pessimists, on the other hand, argue that even five or ten years of stronger productivity growth does not prove that higher productivity will last for the long term. It is hard to infer anything about long-term productivity trends during the later part of the 2000s, because the steep recession of 2008–2009, with its sharp but not completely synchronized declines in output and employment, complicates any interpretation.

Productivity growth is closely linked to the average level of wages. Over time, the amount that firms are willing to pay workers will depend on the value of the output those workers produce. If a few employers tried to pay their workers less than what those workers produced, then those workers would receive offers of higher wages from other profit-seeking employers. If a few employers mistakenly paid their workers more than what those workers produced, those employers would soon end up with losses. In the long run, productivity per hour is the most important determinant of the average wage level in any economy.

Capital Deepening

When society increases the level of capital per person, the result is called **capital deepening**. The idea of capital deepening can apply both to additional human capital per worker and to additional physical capital per worker.

Recall that one way to measure human capital is to look at the average levels of education in an economy. Figure 3 illustrates the human capital deepening for U.S. workers by showing that the proportion of the U.S. population with a high school and a college degree is rising. As recently as 1970, for example, only about half of U.S. adults had at least a high school diploma; by the start of the twenty-first century, more than 80% of adults had graduated from high school. The idea of human capital deepening also applies to the years of experience that workers have, but the average experience level of U.S. workers has not changed much in recent decades. Thus, the key dimension for deepening human capital in the U.S. economy focuses more on additional education and training than on a higher average level of work experience.

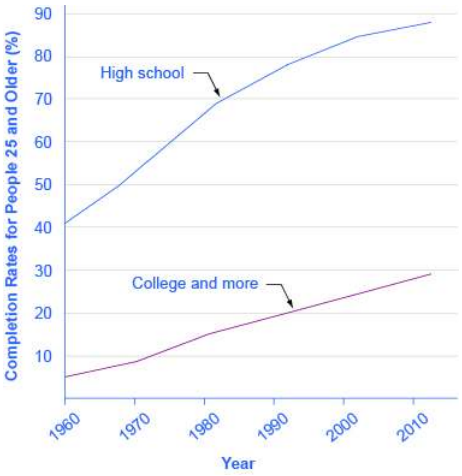


Figure 3. Human Capital Deepening in the U.S. Rising levels of education for persons 25 and older show the deepening of human capital in the U.S. economy. Even today, relatively few U.S. adults have completed a four-year college degree. There is clearly room for additional deepening of human capital to occur. (Source: US Department of Education, National Center for Education Statistics).

Physical capital deepening in the U.S. economy is shown in Figure 4. The average U.S. worker in the late 2000s was working with physical capital worth almost three times as much as that of the average worker of the early 1950s.

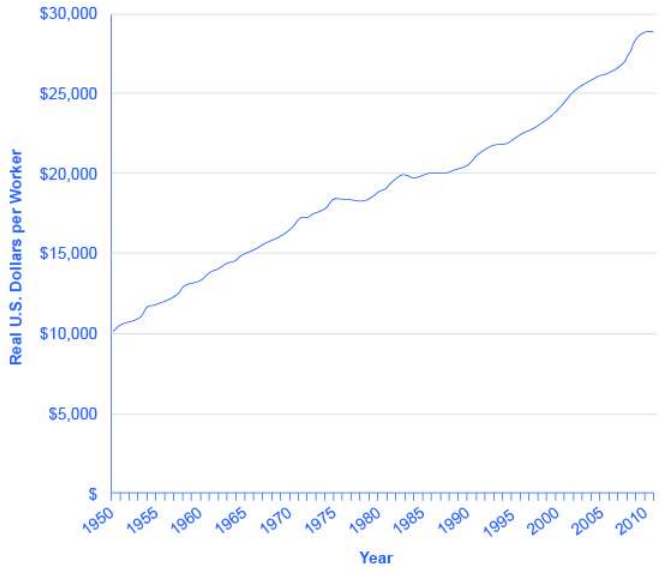


Figure 4. Physical Capital per Worker in the United States. The value of the physical capital, measured by plant and equipment, used by the average worker in the U.S. economy has risen over the decades. The increase may have leveled off a bit in the 1970s and 1980s, which were not, coincidentally, times of slower-than-usual growth in worker productivity. We see a renewed increase in physical capital per worker in the late 1990s, followed by a flattening in the early 2000s. (Source: Center for International Comparisons of Production, Income and Prices, University of Pennsylvania).

Not only does the current U.S. economy have better-educated workers with more and improved physical capital than it did several decades ago, but these workers have access to more advanced technologies. Growth in technology is impossible to measure with a simple line on a graph, but evidence that we live in an age of technological marvels is all around us—discoveries in genetics and in the structure of particles, the wireless Internet, and other inventions almost too numerous to count. **The U.S. Patent and Trademark Office** typically has issued more than 150,000 patents annually in recent years.

This recipe for economic growth—investing in labor productivity, with investments in human capital and technology, as well as increasing physical capital—also applies to other economies. In South Korea, for example, universal enrollment in primary school (the equivalent of kindergarten through sixth grade in the United States) had already been achieved by 1965, when Korea's GDP per capita was still near its rock bottom low. By the late 1980s, Korea had achieved almost universal secondary school education (the equivalent of a high school education in the United States). With regard to physical capital, Korea's rates of investment had been about 15% of GDP at the start of the 1960s, but doubled to 30–35% of GDP by the late 1960s and early 1970s. With regard to technology, South Korean students went to universities and colleges around the world to get scientific and technical training, and South Korean firms reached out to study and form partnerships with firms that could offer them technological insights. These factors combined to foster South Korea's high rate of economic growth.

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Growth Accounting Studies

Since the late 1950s, economists have conducted growth accounting studies to determine the extent to which physical and human capital deepening and technology have contributed to growth. The usual approach uses an aggregate production function to estimate how much of per capita economic growth can be attributed to growth in physical capital and human capital. These two inputs can be measured, at least roughly. The part of growth that is unexplained by measured inputs, called the residual, is then attributed to growth in technology. The exact numerical estimates differ from study to study and from country to country, depending on how researchers measured these three main factors over what time horizons. For studies of the U.S. economy, three lessons commonly emerge from growth accounting studies.

- First, technology is typically the most important contributor to U.S. economic growth. Growth in human capital and physical capital often explains only half or less than half of the economic growth that occurs. New ways of doing things are tremendously important.
- Second, while investment in physical capital is essential to growth in labor productivity and GDP per capita, building human capital is at least as important. Economic growth is not just a matter of more machines and buildings. One vivid example of the power of human capital and technological knowledge occurred in Europe in the years after World War II (1939–1945). During the war, a large share of Europe's physical capital, such as factories, roads, and vehicles, was destroyed. Europe also lost an overwhelming amount of human capital in the form of millions of men, women, and children who died during the war. However, the powerful combination of skilled workers and technological knowledge, working within a market-oriented economic framework, rebuilt Europe's productive capacity to an even higher level within less than two decades.
- A third lesson is that these three factors of human capital, physical capital, and technology work together. Workers with a higher level of education and skills are often better at coming up with new technological innovations. These technological innovations are often ideas that cannot increase production until they become a part of new investment in physical capital. New machines that embody technological innovations often require additional training, which builds worker skills further. If the recipe for economic growth is to succeed, an economy needs all the ingredients of the aggregate production function. See the following feature about girl's education in low-income countries for an example of how human capital, physical capital, and technology can combine to significantly impact lives.

Try It

In the early 2000s, according to the World Bank, about 110 million children between the ages of 6 and 11 were not in school—and about two-thirds of them were girls. In Bangladesh, for example, the illiteracy rate for those aged 15 to 24 was 78% for females, compared to 75% for males. In Egypt, for this age group, illiteracy was 84% for females and 91% for males. Cambodia had 86% illiteracy for females and 88% for males. Nigeria had 66% illiteracy for females in the 15 to 24 age bracket and 78% for males.

Whenever any child does not receive a basic education, it is both a human and an economic loss. In low-income countries, wages typically increase by an average of 10 to 20% with each additional year of education. There is, however, some intriguing

evidence that helping girls in low-income countries to close the education gap with boys may be especially important, because of the social role that many of the girls will play as mothers and homemakers.

Girls in low-income countries who receive more education tend to grow up to have fewer, healthier, better-educated children. Their children are more likely to be better nourished and to receive basic health care like immunizations. Economic research on women in low-income economies backs up these findings. When 20 women get one additional year of schooling, as a group they will, on average, have one less child. When 1,000 women get one additional year of schooling, on average one to two fewer women from that group will die in childbirth. When a woman stays in school an additional year, that factor alone means that, on average, each of her children will spend an additional half-year in school. Education for girls is a good investment because it is an investment in economic growth with benefits beyond the current generation.

Try It

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This question allow you to get as much practice as you need, as you can click the link at the top of the question ("Try another version of this question") to get a new version of the question. Practice until you feel comfortable doing the question.

[ohm_question]152058[/ohm_question]

Learning Objectives

[glossary-page][glossary-term]capital deepening:[/glossary-term]
[glossary-definition] an increase by society in the average level of physical and/or human capital per person[/glossary-definition][/glossary-page]

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6.22: The Power of Sustained Economic Growth

Learning Objectives

- Explain the Power of Compound Growth, including the rule of 72

The Power of Sustained Economic Growth

Nothing is more important for increasing people's standard of living than sustained economic growth. Even small changes in the rate of growth, when sustained and compounded over long periods of time, make an enormous difference in the standard of living. Consider Table 1, in which the rows of the table show several different rates of growth in GDP per capita and the columns show different periods of time. Assume for simplicity that an economy starts with a GDP per capita of 100. The table then applies the following formula to calculate what GDP will be at the given growth rate in the future:

$$\text{GDP at starting date} \times (1 + \text{growth rate of GDP})^{\text{years}} = \text{GDP at end date}$$

For example, an economy that starts with a GDP of 100 and grows at 3% per year will reach a GDP of 209 after 25 years; that is, $100\ (1.03)^{25} = 209$.

Table 1. Growth of GDP over Different Time Horizons

Growth Rate	Value of an original 100 in 10 Years	Value of an original 100 in 25 Years	Value of an original 100 in 50 Years
1%	110	128	164
3%	134	209	438
5%	163	338	1,147
8%	216	685	4,690

The slowest rate of GDP per capita growth in the table, just 1% per year, is similar to what the United States experienced during its weakest years of productivity growth. The second highest rate, 3% per year, is close to what the U.S. economy experienced during the strong economy of the late 1990s and into the 2000s. Higher rates of per capita growth, such as 5% or 8% per year, represent the experience of rapid growth in economies like Japan, Korea, and China.

Table 1 shows that even a few percentage points of difference in economic growth rates will have a profound effect if sustained and compounded over time. For example, an economy growing at a 1% annual rate over 50 years will see its GDP per capita rise by a total of 64%, from 100 to 164 in this example. However, a country growing at a 5% annual rate will see (almost) the same amount of growth—from 100 to 163—over just 10 years. Rapid rates of economic growth can bring profound transformation. If the rate of growth is 8%, young adults starting at age 20 will see the average standard of living in their country more than double by the time they reach age 30, and grow nearly sevenfold by the time they reach age 45.

Try It

The world's great economic success stories in the last few decades began in the 1970s with that group of nations sometimes known as the East Asian Tigers: South Korea, Thailand, Malaysia, Indonesia, and Singapore. The list sometimes includes Hong Kong and Taiwan, although these are often treated under international law as part of China, rather than as separate countries. The economic growth of the Tigers has been phenomenal, typically averaging 5.5% real per capita growth for several decades. In the 1980s, other countries began to show signs of convergence. China began growing rapidly, often at annual rates of 8% to 10% per year. India began growing rapidly, first at rates of about 5% per year in the 1990s, but then higher still in the first decade of the 2000s.

It is worth pausing a moment to marvel at the growth rates of the East Asian Tigers. If per capita GDP grows at, say, 6% per year, then you can apply the formula for compound growth rates—that is $(1 + 0.06)^{30}$—meaning a nation's level of per capita GDP will rise by a multiple of almost six over 30 years. Another strategy is to apply the rule of 72.

The **rule of 72** is an approximation to figure out doubling time. The rule number, 72, is divided by the annual growth rate to obtain the approximate number of years it will take for income to double. So if we have a 6% growth rate, it will take 72/6, or 12 years, for incomes to double. Using this rule here suggests that a Tiger that grows at 6% will double its GDP every 12 years. In contrast, a technological leader, chugging along with per capita growth rates of about 2% per year, would double its income in 36 years.

Try It

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HOW ARE COMPOUND GROWTH RATES AND COMPOUND INTEREST RATES RELATED?

The formula for growth rates of GDP over different periods of time, as shown above, is exactly the same as the formula for how a given amount of financial savings grows at a certain interest rate over time. Both formulas have the same ingredients: an original starting amount, in one case GDP and in the other case an amount of financial saving; a percentage increase over time, in one case the growth rate of GDP and in the other case an interest rate; and an amount of time over which this effect happens.

Recall that compound interest is interest that is earned on past interest. It causes the total amount of financial savings to grow dramatically over time. Similarly, compound rates of economic growth, or the *compound growth rate*, means that the rate of growth is being multiplied by a base that includes past GDP growth, with dramatic effects over time.

For example, in 2016, the World Fact Book, produced by the Central Intelligence Agency, reported that South Korea had a GDP of $1.93 trillion with a growth rate of 2.8%. We can estimate that at that growth rate, South Korea's GDP will be $2.22 trillion in five years. If we apply the growth rate to each year's ending GDP for the next five years, we will calculate that at the end of year one, GDP is $1.98 trillion. In year two, we start with the end-of-year one value of $1.98 and increase it by 2.8%. Year three starts with the end-of-year two GDP, and we increase it by 2.8% and so on, as depicted in the Table 2.

Table 2. Estimated End-of-year GDP, from 2016

Year	Starting GDP	Growth Rate 2%	Year-End Amount
1	$1.93 Trillion ×	(1+0.02)	$1.98 Trillion
2	$1.98 Trillion ×	(1+0.02)	$2.04 Trillion
3	$2.04 Trillion ×	(1+0.02)	$2.10 Trillion
4	$2.10 Trillion ×	(1+0.02)	$2.16 Trillion
5	$2.16 Trillion ×	(1+0.02)	$2.22 Trillion

Another way to calculate the growth rate is to apply the following formula:

$$\text{Future Value} = \text{Present Value} \times (1 + g)^n$$

Where "future value" is the value of GDP five years hence, "present value" is the starting GDP amount of $1.93 trillion, "g" is the growth rate of 2.8%, and "n" is the number of periods for which we are calculating growth. Let's look as this as applied to South Korea. At a growth rate of 2.8%, in 5 years, the GDP should from $1.93 trillion to $2.22 trillion.

$$\text{Future Value} = 1.93 \times (1 + 0.028)^5 = \$2.22 \text{ trillion}$$

Learning Objectives

[glossary-page][glossary-term]compound growth rate: [/glossary-term]
[glossary-definition]the rate of growth when multiplied by a base that includes past GDP growth[/glossary-definition]
[glossary-term]rule of 72:[/glossary-term][glossary-definition] an approximation to figure out doubling time. 72 is divided by

the annual growth rate to obtain the approximate number of years it will take for income to double [/glossary-definition] [/glossary-page]

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6.23: Introduction to Historical Economic Growth

What you'll learn to do: understand that economic growth is a relatively recent phenomenon and identify key institutional factors that contribute to economic growth



Earlier in this module we observed that economic growth involves a broad collection of societal changes, which lead to increasing living standards. In this section, we will explain a number of institutional factors that allow or inhibit a society's economic growth.

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6.24: Relatively Recent Economic Growth

Learning Objectives

- Explain the conditions that have allowed for modern economic growth in the last two centuries

Global Economic Growth

Every country worries about economic growth. In the United States and other high-income countries, the question is whether economic growth continues to provide the same remarkable gains in our standard of living as it did during the twentieth century. Meanwhile, can middle-income countries like South Korea, Brazil, Egypt, or Poland catch up to the higher-income countries? Or must they remain in the second tier of per capita income? Of the world's population of roughly 6.7 billion people, about 2.6 billion are scraping by on incomes that average less than $2 per day, not that different from the standard of living 2,000 years ago. Can the world's poor be lifted from their fearful poverty? As the 1995 Nobel laureate in economics, Robert E. Lucas Jr., once noted: "The consequences for human welfare involved in questions like these are simply staggering: Once one starts to think about them, it is hard to think about anything else."

Dramatic improvements in a nation's standard of living are possible. After the Korean War in the late 1950s, the Republic of Korea, often called South Korea, was one of the poorest economies in the world. Most South Koreans worked in peasant agriculture. From the 1960s to the early twenty-first century, a time period well within the lifetime and memory of many adults, the South Korean economy grew rapidly. Over these four decades, GDP per capita increased by more than 6% per year. GDP for South Korea now exceeds $30,000 in nominal terms, placing it firmly among high-income countries like Italy, New Zealand, and Israel. Measured by total GDP in 2012, South Korea is the thirteenth-largest economy in the world. For a nation of 49 million people, this transformation is extraordinary.

South Korea is a standout example, but it is not the only case of rapid and sustained economic growth. Other nations of East Asia, like Thailand and Indonesia, have seen very rapid growth as well. China has grown enormously since market-oriented economic reforms were enacted around 1980. GDP per capita in high-income economies like the United States also has grown dramatically albeit over a longer time frame. Since the Civil War, the U.S. economy has been transformed from a primarily rural and agricultural economy to an economy based on services, manufacturing, and technology.

The Relatively Recent Arrival of Economic Growth

Let's begin with a brief overview of the spectacular patterns of economic growth around the world in the last two centuries, commonly referred to as the period of **modern economic growth**. Rapid and sustained economic growth is a relatively recent experience for the human race. Before the last two centuries, although rulers, nobles, and conquerors could afford some extravagances and although economies rose above the subsistence level, the average person's standard of living had not changed much for centuries.

Progressive, powerful economic and institutional changes started to have a significant effect in the late eighteenth and early nineteenth centuries. According to the Dutch economic historian Jan Luiten van Zanden, slavery-based societies, favorable demographics, global trading routes, and standardized trading institutions that spread with different empires set the stage for the Industrial Revolution to succeed. The **Industrial Revolution** refers to the widespread use of power-driven machinery and the economic and social changes that resulted in the first half of the 1800s. Ingenious machines—the steam engine, the power loom, and the steam locomotive—performed tasks that otherwise would have taken vast numbers of workers to do. The Industrial Revolution began in Great Britain, and soon spread to the United States, Germany, and other countries.

The jobs for ordinary people working with these machines were often dirty and dangerous by modern standards, but the alternative jobs of that time in peasant agriculture and small-village industry were often dirty and dangerous, too. The new jobs of the Industrial Revolution typically offered higher pay and a chance for social mobility. A self-reinforcing cycle began: new inventions and investments generated profits, the profits provided funds for new investment and inventions, and the investments and inventions provided opportunities for further profits. Slowly, a group of national economies in Europe and North America emerged from centuries of sluggishness into a period of rapid modern growth. During the last two centuries, the average rate of growth of

GDP per capita in the leading industrialized countries has averaged about 2% per year. What were times like before then? Read on for the answer.

Try It

Angus Maddison, a quantitative economic historian, led the most systematic inquiry into national incomes before 1870. His methods recently have been refined and used to compile GDP per capita estimates from year 1 C.E. to 1348. Table 1 is an important counterpoint to most of the narrative in this section. It shows that nations can decline as well as rise. The declines in income are explained by a wide array of forces, such as epidemics, natural and weather-related disasters, the inability to govern large empires, and the remarkably slow pace of technological and institutional progress. Institutions are the traditions, laws, and so on by which people in a community agree to behave and govern themselves. Such institutions include marriage, religion, education, and laws of governance. Institutional progress is the development and codification of these institutions to reinforce social order, and thus, economic growth.

One example of such an institution is the Magna Carta (Great Charter), which the English nobles forced King John to sign in 1215. The Magna Carta codified the principles of due process, whereby a free man could not be penalized unless his peers had made a lawful judgment against him. This concept was later adopted by the United States in its own constitution. This social order may have contributed to England's GDP per capita in 1348, which was second to that of northern Italy.

In the study of economic growth, a country's institutional framework plays a critical role. Table 1 also shows relative global equality for almost 1,300 years. After this, we begin to see significant divergence in income (not shown in table).

Table 1. GDP Per Capita Estimates in Current International Dollars from AD 1 to 1348

Year	Northern Italy	Spain	England	Holland	Byzantium	Iraq	Egypt	Japan
1	$800	$600	$600	$600	$700	$700	$700	–
730	–	–	–	–	–	$920	$730	$402
1000	–	–	–	–	$600	$820	$600	–
1150	–	–	–	–	$580	$680	$660	$520
1280	–	–	–	–	–	–	$670	$527
1300	$1,588	$864	$892	–	–	–	$610	–
1348	$1,486	$907	$919	–	–	–	–	–

(Source: Bolt and van Zanden. "The First Update of the Maddison Project. Re-Estimating Growth Before 1820." 2013)

Another fascinating and underreported fact is the high levels of income, compared to others at that time, attained by the Islamic Empire Abbasid Caliphate—which was founded in present-day Iraq in 730 C.E. At its height, the empire spanned large regions of the Middle East, North Africa, and Spain until its gradual decline over 200 years.

The Industrial Revolution led to increasing inequality among nations. Some economies took off, whereas others, like many of those in Africa or Asia, remained close to a subsistence standard of living. General calculations show that the 17 countries of the world with the most-developed economies had, on average, 2.4 times the GDP per capita of the world's poorest economies in 1870. By 1960, the most developed economies had 4.2 times the GDP per capita of the poorest economies.

However, by the middle of the twentieth century, some countries had shown that catching up was possible. Japan's economic growth expanded in the 1960s and 1970s, with a growth rate of real GDP per capita averaging 11% per year during those decades. Certain countries in Latin America experienced a boom in economic growth in the 1960s as well. In Brazil, for example, GDP per capita expanded by an average annual rate of 11.1% from 1968 to 1973. In the 1970s, some East Asian economies, including South Korea, Thailand, and Taiwan, saw rapid growth. In these countries, growth rates of 11% to 12% per year in GDP per capita were not uncommon. More recently, China, with its population of 1.3 billion people, grew at a per capita rate 9% per year from 1984 into

the 2000s. India, with a population of 1.1 billion, has shown promising signs of economic growth, with growth in GDP per capita of about 4% per year during the 1990s and climbing toward 7% to 8% per year in the 2000s.

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LINK IT UP

Visit the Asian Development Bank website to read about the organization's efforts in eliminating poverty and providing economic assistance to areas in Asia and the Pacific.

These waves of catch-up economic growth have not reached all shores. In certain African countries like Niger, Tanzania, and Sudan, for example, GDP per capita at the start of the 2000s was still less than $300, not much higher than it was in the nineteenth century and for centuries before that. In the context of the overall situation of low-income people around the world, the good economic news from China (population: 1.3 billion) and India (population: 1.1 billion) is, nonetheless, astounding and heartening.

Economic growth in the last two centuries has made a striking change in the human condition. *Richard Easterlin*, an economist at the University of Southern California, wrote in 2000:

By many measures, a revolution in the human condition is sweeping the world. Most people today are better fed, clothed, and housed than their predecessors two centuries ago. They are healthier, live longer, and are better educated. Women's lives are less centered on reproduction and political democracy has gained a foothold. Although Western Europe and its offshoots have been the leaders of this advance, most of the less developed nations have joined in during the 20th century, with the newly emerging nations of sub-Saharan Africa the latest to participate. Although the picture is not one of universal progress, it is the greatest advance in the human condition of the world's population ever achieved in such a brief span of time.

Learning Objectives

[glossary-page][glossary-term]Industrial Revolution: [/glossary-term][glossary-definition]the widespread use of power-driven machinery and the economic and social changes that occurred in the first half of the 1800s[/glossary-definition] [glossary-term]modern economic growth: [/glossary-term][glossary-definition]the period of rapid economic growth from 1870 onward[/glossary-definition][/glossary-page]

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CHAPTER OVERVIEW

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7.3: Benefits of Low Inflation
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7.1: Why It Matters- Unemployment and Inflation

Why evaluate macro economic performance using indicators that include unemployment and inflation?



We learned in the last module that just as doctors run tests to check your overall health, economists examine economic indicators to assess the health of an economy. In this module, we'll learn about the economic indicators of unemployment and inflation.

Unemployment is an important macroeconomic indicator for several reasons. The amount of unemployment speaks to how well our economy is operating. Unemployment means we are not using our labor efficiently, so we are not producing the maximum goods and services we could. In the same way that hours spent not studying for an exam cannot be recovered, those lost goods and services are essentially gone forever. Unemployment also represents a personal cost. No matter how well things are going for the average citizen, those without jobs, and thus without incomes, will be in a worse situation.

The United States' economy is enormous in size and incredibly dynamic. The labor force consists of more than 160 million workers. On average, 130,000 new workers enter the labor force each month, so the economy needs to produce at least that many jobs to keep everyone employed. Most months, it does. But that's not true during recessions, when the number of jobs doesn't keep up, and thus, unemployment rises.

Nearly eight million U.S. jobs were lost during the Great Recession of 2008-2009, with unemployment peaking at 10% in October 2009, according to the Bureau of Labor Statistics (BLS). That is a huge number of positions gone.vThe pattern of the last few recessions has been that it takes a while for jobs to come back, even after business has improved. Thus, unemployment stays abnormally high for longer than we think it should.

In this module we'll consider various aspects of unemployment. How is it measured? What causes unemployment? And if the economy is growing, why isn't the pool of job openings growing along with it?

We introduced the concept of inflation in our earlier discussion of the critical difference between real and nominal GDP. In this module, we will explain how inflation affects individuals, both negatively and positively, as well as how it affects the economy as a whole. We will also explore in more detail what a price index is, and how price indices are used to compute the rate of inflation.

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7.2: Learn By Doing- Problems with Inflation

Try It

These questions allow you to get as much practice as you need, as you can click the link at the top of the first question ("Try another version of these questions") to get a new set of questions. Practice until you feel comfortable doing the questions.

[ohm_question]152110-152111-152112-152113-152115-152116-152118-152120[/ohm_question]

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7.3: Benefits of Low Inflation

Learning Objectives

- Explain the possible economic benefits of inflation

Potential Benefits of Low Inflation

Although the economic effects of inflation are primarily negative, two countervailing points are worth noting. First, the impact of inflation will differ considerably according to whether it is creeping up slowly at 0% to 2% per year, galloping along at 10% to 20% per year, or racing to the point of hyperinflation at, say, 40% per month. Hyperinflation can rip an economy and a society apart. An annual inflation rate of 2%, 3%, or 4%, however, is a long way from a national crisis. If variability in inflation rates is a problem, then moderate and high inflations are more likely to have significant variability than are low inflations.

Low inflation is also better than deflation which occurs with severe recessions. More precisely, targeting a zero rate of inflation risks undershooting which is deflation. Deflation has similar problems as inflation but working in reverse. For example, debtors end up paying more for loans as a result of unexpected deflation.

Second, an argument is sometimes made that moderate inflation may help the economy by making wages in labor markets more flexible. The earlier discussion on unemployment pointed out that wages tend to be sticky in their downward movements and that unemployment can result. A little inflation could nibble away at real wages, and thus help real wages to decline if necessary. In this way, even if a moderate or high rate of inflation may act as sand in the gears of the economy, perhaps a low rate of inflation serves as oil for the gears of the labor market. This argument is controversial. A full analysis would have to take all the effects of inflation into account. It does, however, offer another reason to believe that, all things considered, very low rates of inflation may not be especially harmful.

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7.4: Putting It Together- Inflation and Unemployment

This module explained that the economy goes through cycles of speeding up and slowing down. Recession doesn't just mean a slowdown in the economy (a decrease in economic growth), but rather negative economic growth, a decrease in real GDP over at least six months, so that the economy is actually producing fewer goods and services than in did before.

Recessions happen on average about once every five years, and they tend to average one year of recession and four years of expansion. Cyclical unemployment increases during recession and decreases during expansion. The measured unemployment rate never gets to zero, because of frictional unemployment, the time it takes for employers and job seekers to find each other, and because of structural unemployment, those who do not have jobs because of lack of skills. The economy is close to full employment when the measured rate reaches perhaps five percent.

Inflation makes it harder to determine what products are relatively cheap or expensive. They also redistribute income arbitrarily. Fortunately, the U.S. economy has not experienced significant inflation since the early 1980s.

Watch It

Using what you've learned, you should be able to judge the current state of the economy. Here is one judgment from 2014:

An interactive or media element has been excluded from this version of the text. You can view it online here: http://pb.libretexts.org/mlum/?p=339

Now that you know the most important economic indicators, the rest of this text will explain what causes them to do what they do and how they are related to one another.

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7.5: Assignment- The State of the Macro Economy

This table shows U.S. economic indicators for a five-year period. All variables are measured in percent.

Table 1. U.S. Economic Indicators for a Five Year Period		
GDP Growth	**Inflation**	**Unemployment**
2.5	2.1	5.6
3.7	1.9	5.4
4.5	1.8	4.9
4.4	1.1	4.5
4.8	1.5	4.2

How would you characterize the state of the economy over this time period and especially in the final year shown? What do you expect will happen in subsequent years? Please explain your reasoning in detail.

Rubric

Criteria	Not Evident	Developing	Proficient	Distinguished	Weight
Assess the state of the economy based on the data for the GDP Growth indicator					5
Assess the state of the economy based on the data for the Inflation indicator					5
Assess the state of the economy based on the data for the Unemployment indicator					5
Predict what will happen in subsequent years based on the data for all three indicators					4
Articulation of response (citations, grammar, spelling, syntax, or organization that negatively impact readability and articulation of main ideas.)					1
					Total: 20

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7.6: Assignment- Data Project Part 2

This is a continuation of the data project you began in the last module. We have already examined GDP, and will now turn to the other macroeconomic measures of unemployment and inflation.

PART 2:

Go to the Bureau of Labor Statistics web site. http://www.bls.gov

A. Unemployment

Look around the site and see what is there. Use the "Latest Numbers" window (right side of home page) and "Unemployment Rate" link to go to the "Employment Situation Summary" and Table A-1. Read at least the first paragraph of the summary. The links on the right side of the "Latest Numbers" page will take you to historical data (ie. National Unemployment Rate — dinosaur icons for historical data). For State, use "State/Local Unemployment" link on right side of page.

1. What is the current national unemployment rate and reporting date? How has that changed over the past 10 years?
2. Look at Table A-1 (table links at bottom of Economic Situation Summary), and find your age and gender group. What is the current unemployment rate(not seasonally adjusted) for your group? How has it changed over the past year?
3. What is the current unemployment rate in our state? How has it changed over the past 10 years?

B. Inflation

Use the CPI link on the "Latest Numbers" page to go to the Table of Contents. Click on the "Consumer Price Index Summary." Read the summary, then scroll down to Table A. The Summary will explain much about the table and numbers you are using. Table A summarizes the percent change data from Table 1 (Table of Contents). You'll also find this data there along with more detail.

1. What is the release date on your report?
2. What is the current annual inflation rate (all items)? Check the summary and the Table A for "Unadjusted % Change 12-months ended…" .
3. What is the current annual inflation rate for Energy ("Unadjusted % Change 12-months ended…")?
4. Which item ("Unadjusted % Change 12-months ended…") shows the greatest inflation? How much? What factors do you think cause this one to be the greatest?
5. What is the value of the unadjusted CPI for the most recent month listed? Use Table 1: CPI-U for this. It is listed in the links at the bottom of the page.
6. What is the base year for the CPI?
7. Explain the difference between the CPI and inflation.

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7.7: Discussion- How is the Economy?

Respond to the following prompts in a post with a minimum of 250 words, then comment on at least TWO other posts. Respond to the posts indicating your agreement or disagreement with their position and why. Feel free to bring in additional references to these reply posts.

- How has the U.S. economy been doing in recent years? Why do you think that is? Gather relevant economic statistics, such as the growth rate of real GDP, the unemployment rate, and the inflation rate, to support your case. (Hint: use the information we've covered and you've researched in the data project about GDP, business cycles, unemployment, and inflation to build your argument).
- Did any of the data from the project surprise you? Which data? Why? Does this data indicate a growing, stagnant or declining economy? What does this data tell you about the health of our economy? Why?
- Find a current news or journal article that describes our current economy and that supports your opinion. Summarize the article and indicate how it supports your opinion. Use sound economic reasoning.

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7.8: Assignment- Problem Set — Unemployment and Inflation

Click on the following link to download the problem set for this module:

- Unemployment and Inflation Problem Set

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7.9: Introduction to the Unemployment Rate

What you'll learn to do: describe and calculate unemployment



Figure 1. Out of Business. Borders was one of the many companies unable to recover from the economic recession of 2008-2009. (Credit: modification of work by Luis Villa del Campo/Flickr Creative Commons)

In this section, we'll examine unemployment. First, we'll take a look at what it is, how it it measured, and general trends over time.

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7.10: Who Counts in Unemployment?

Learning Objectives

- Define and differentiate between employed, unemployed, and being in or out of the labor force

The Cost of Unemployment

Unemployment can be a terrible and wrenching life experience—like a serious automobile accident or a messy divorce—whose consequences can be fully understood only by someone who has gone through it. For unemployed individuals and their families, there is the day-to-day financial stress of not knowing where the next paycheck is coming from. There are painful adjustments, like watching your savings account dwindle, selling a car and buying a cheaper one, or moving to a less expensive place to live. Even when the unemployed person finds a new job, it may pay less than the previous one. For many people, their job is an important part of their self worth. When unemployment separates people from the workforce, it can affect family relationships as well as mental and physical health.

The human costs of unemployment alone would justify making a low level of unemployment an important public policy priority. But unemployment also includes economic costs to the broader society. When millions of unemployed but willing workers cannot find jobs, an economic resource is going unused. An economy with high unemployment is like a company operating with a functional but unused factory. The opportunity cost of unemployment is the output that could have been produced by the unemployed workers.

Calculating Unemployment

Unemployment is typically described in newspaper or television reports as a percentage or a rate. A report might say, for example, from January 2013 to December 2013, the U.S. unemployment rate dropped from 8.0% to 6.7%, and by the close of 2015, it had fallen to 5.0%. At a glance, the changes between the percentages may seem small. But remember that the U.S. economy has over 160 million adults who either have jobs or are looking for them. A rise or fall of just 0.1% in the unemployment rate of 160 million potential workers translates into 160,000 people, which is roughly the total population of a city like Syracuse, New York, Brownsville, Texas, or Pasadena, California. Large rises in the unemployment rate mean large numbers of job losses. The decrease in unemployment from 8% in 6.7% 2013 meant an additional 2.02 million people were employed who had previously been looking for work.

Link It Up

The Bureau of Labor Statistics tracks and reports all data related to unemployment.

Who's In or Out of the Labor Force?

Should everyone without a job be counted as unemployed? Of course not. Children, for example, should not be counted as unemployed. Surely, the retired should not be counted as unemployed. Many full-time college students have only a part-time job, or no job at all, but it seems inappropriate to count them as suffering the pains of unemployment. Some people are not working because they are rearing children, ill, on vacation, or on parental leave.

watch It

Learn about what constitutes the labor force in this short video:

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The point is that the adult population is not just divided into employed and unemployed. A third group exists: people who do not have a job, and for some reason—retirement, looking after children, taking a voluntary break before a new job—are not interested in having a job, either. It also includes those who do want a job but have quit looking, often due to being discouraged by their inability to find suitable employment. Economists refer to this third group of those who are not working and not looking for work as **out of the labor force**.



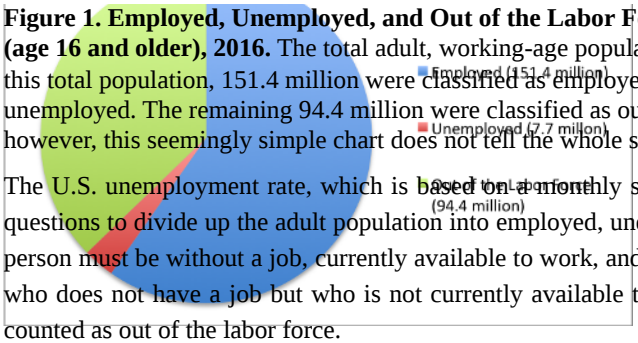


Figure 1. Employed, Unemployed, and Out of the Labor Force Distribution of Adult Population (age 16 and older), 2016. The total adult, working-age population in 2016 was 253.5 million. Out of this total population, 151.4 million were classified as employed and 7.7 million were classified as unemployed. The remaining 94.4 million were classified as out of the labor force. As you will learn, however, this seemingly simple chart does not tell the whole story.

The U.S. unemployment rate, which is based on a monthly survey carried out by the U.S. Bureau of the Census, asks a series of questions to divide up the adult population into employed, unemployed, or not in the labor force. To be classified as unemployed, a person must be without a job, currently available to work, and actively looking for work in the previous four weeks. Thus, a person who does not have a job but who is not currently available to work or has not actively looked for work in the last four weeks is counted as out of the labor force.

- **Employed**: currently working for pay
- **Unemployed**: Out of work and actively looking for a job
- **Out of the labor force**: Out of paid workforce and/or not actively looking for a job
- **Labor force**: the number of employed plus the unemployed

Try It

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Glossary

[glossary-page][glossary-term]discouraged workers: [/glossary-term]
[glossary-definition]those who have stopped looking for employment due to the lack of suitable positions available[/glossary-definition]
[glossary-term]out of the labor force: [/glossary-term]
[glossary-definition]those who are not working and not looking for work—whether they want employment or not; also termed “not in the labor force”[/glossary-definition][glossary-term]underemployed: [/glossary-term][glossary-definition]individuals who are employed in a job that is below their skills[/glossary-definition][/glossary-page]

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- (Macro) Episode 18: Unemployment. **Authored by**: Dr. Mary McGlasson. **Located at**: https://www.youtube.com/watch?v=_CdTu1pk06w&index=18&list=PLF2A3693D8481F442. **License**: *CC BY-NC-ND: Attribution-NonCommercial-NoDerivatives*

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7.11: Calculating the Unemployment Rate

Learning Objectives

- Calculate labor force percentages and the unemployment rate

Calculating the Unemployment Rate

Remember that the unemployed are those who are out of work and who are actively looking for a job. We can calculate the unemployment rate by dividing the number of unemployed people by the total number in the labor force, then multiplying by 100.

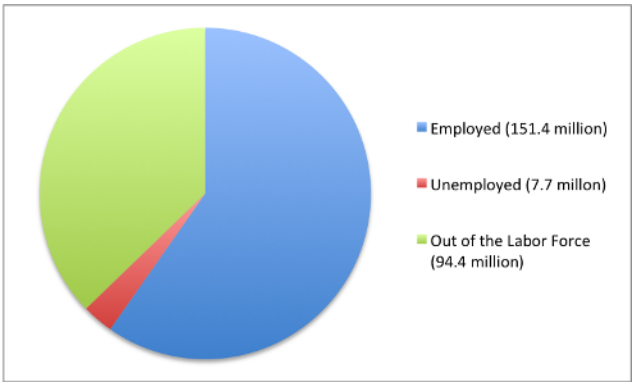


Figure 1. Employed, Unemployed, and Out of the Labor Force Distribution of Adult Population (age 16 and older), 2016. The total adult, working-age population in 2016 was 253.5 million. Out of this total population, 151.4 million were classified as employed and 7.7 million were classified as unemployed. The remaining 94.4 million were classified as out of the labor force. As you will learn, however, this seemingly simple chart does not tell the whole story.

Figure 1 shows the three-way division of the over-16 adult population. In 2016, 62.8% of the adult population was in the labor force; that is, either employed or without a job but looking for work. Those in the labor force can be divided into the employed and the unemployed. These values are also shown in Table 1. The unemployment rate is not the percentage of the total adult population without jobs, but rather the percentage of adults who are in the labor force but who do not have jobs:

$$\text{Unemployment rate}=\frac{\text{Unemployed people}}{\text{Total labor force}}\times 100$$

Table 1. U.S. Employment and Unemployment, 2016	
Total adult population over the age of 16	253.5 million
In the labor force	159.1 million (62.8%)
Employed	151.4 million
Unemployed	7.7 million
Out of the labor force	94.4 million (37.2%)
Source: www.bls.gov	

Based on the data in Table 1, what's the unemployment rate in 2016? In this example, the unemployment rate can be calculated as 7.7 million unemployed people divided by 159.1 million people in the labor force, which works out to an 4.8% rate of unemployment. Read on to walk through the steps of calculating this percentage.

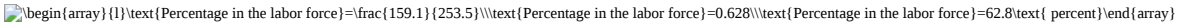
Calculating Labor Force Percentages

So how do economists arrive at the percentages in and out of the labor force and the unemployment rate? We will use the values in Table 1 to illustrate the steps.

To determine the percentage in the labor force:

Step 1. Divide the number of people in the labor force (159.1 million) by the total adult (working-age) population (253.5 million).

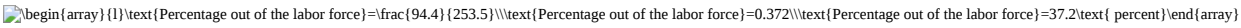
Step 2. Multiply by 100 to obtain the percentage.



To determine the percentage out of the labor force:

Step 1. Divide the number of people out the labor force (94.4 million) by the total adult (working-age) population (253.5 million).

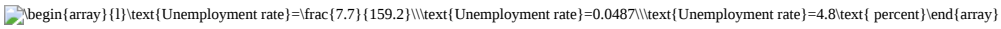
Step 2. Multiply by 100 to obtain the percentage.



To determine the unemployment rate:

Step 1. Divide the number of unemployed people (7.7 million) by the total labor force (159.2 million).

Step 2. Multiply by 100 to obtain the rate.



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Hidden Unemployment

Even with the "out of the labor force" category, there are still some people who are mislabeled in the categorization of employed, unemployed, or out of the labor force. There are some people who have only part time or temporary jobs and who are looking for full time and permanent employment that are counted as employed, though they are not employed in the way they would like or need to be. Additionally, there are individuals who are **underemployed**. This includes those that are trained or skilled for one type or level of work who are working in a lower paying job or one that does not utilize their skills. For example, an individual with a college degree in finance who is working as a sales clerk would be considered underemployed. They are, however, also counted in the employed group. All of these individuals fall under the umbrella of the term "**hidden unemployment**." **Discouraged workers,** those who have stopped looking for employment and, hence, are no longer counted in the unemployed also fall into this group.

Labor Force Participation Rate

Another important statistic is the **labor force participation rate**. This is the percentage of adults in an economy who are either employed or who are unemployed and looking for a job. So, using the data in Figure 1 and Table 1, those included in this calculation would be the 159.2 million individuals in the labor force. The rate is calculated by taking the number employed, divided by the total adult population and multiplying by 100 to get the percentage. For the data from 2016, the labor force participation rate is 62.8%. In the United States the labor force participation rate is usually around 66-68%, though it has declined over the last decade.

Reporting Employment and Unemployment

The Establishment Payroll Survey

When the unemployment report comes out each month, the Bureau of Labor Statistics (BLS) also reports on the number of jobs created—which comes from the establishment payroll survey (EPS). The payroll survey is based on a survey of about 140,000 businesses and government agencies throughout the United States. It generates payroll employment estimates by the following criteria: all employees, average weekly hours worked, and average hourly, weekly, and overtime earnings. One of the criticisms of this survey is that it does not count the self-employed. It also does not make a distinction between new, minimum wage, part time or temporary jobs and full time jobs with "decent" pay.

The unemployment rate announced by the U.S. Bureau of Labor Statistics each month is based on the Current Population Survey (CPS), which has been carried out every month since 1940 by the U.S. Bureau of the Census. Great care is taken to make this survey representative of the country as a whole. The country is first divided into 3,137 areas. Then 729 of these areas are chosen to be surveyed. The 729 areas are then divided into districts of about 300 households each, and each district is divided into clusters of about four dwelling units. Every month, Census Bureau employees call about 15,000 of the four-household clusters, for a total of 60,000 households. Households are interviewed for four consecutive months, then rotated out of the survey for eight months, and then interviewed again for the same four months the following year, before leaving the sample permanently.

Based on this survey, unemployment rates are calculated by state, industry, urban and rural areas, gender, age, race or ethnicity, and level of education. A wide variety of other information is available, too. For example, how long have people been unemployed? Did they become unemployed because they quit, or were laid off, or their employer went out of business? Is the unemployed person the only wage earner in the family?

THE CPS and EPS

While both the Current Population Survey (CPS) and the Establishment Payroll Survey (EPS) both provide reports about jobs, the CPS measures the percentage of the labor force that is unemployed, while the EPS measures the net change in jobs created for the month.

Criticisms of Measuring Unemployment

There are always complications in measuring the number of unemployed. For example, what about people who do not have jobs and would be available to work, but have gotten discouraged at the lack of available jobs in their area and stopped looking? Such people, and their families, may be suffering the pains of unemployment. But the survey counts them as out of the labor force because they are not actively looking for work. Other people may tell the Census Bureau that they are ready to work and looking for a job but, truly, they are not that eager to work and are not looking very hard at all. They are counted as unemployed, although they might more accurately be classified as out of the labor force. Still other people may have a job, perhaps doing something like yard work, child care, or cleaning houses, but are not reporting the income earned to the tax authorities. They may report being unemployed, when they actually are working.

Although the unemployment rate gets most of the public and media attention, economic researchers at the Bureau of Labor Statistics publish a wide array of surveys and reports that try to measure these kinds of issues and to develop a more nuanced and complete view of the labor market. It is not exactly a hot news flash that economic statistics are imperfect. Even imperfect measures like the unemployment rate, however, can still be quite informative, when interpreted knowledgeably and sensibly.

Glossary

[glossary-page][glossary-term]discouraged workers: [/glossary-term]
[glossary-definition]those who have stopped looking for employment due to the lack of suitable positions available[/glossary-definition][glossary-term]labor force participation rate: [/glossary-term][glossary-definition]this is the percentage of adults in an economy who are either employed or who are unemployed and looking for a job[/glossary-definition][glossary-term]underemployed: [/glossary-term][glossary-definition]individuals who are employed in a job that is below their skills[/glossary-definition][glossary-term]unemployment rate: [/glossary-term][glossary-definition]the percentage of adults who are in the labor force and thus seeking jobs, but who do not have jobs[/glossary-definition][/glossary-page]

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7.12: Learn By Doing- Calculating the Unemployment Rate

Try It

These questions allow you to get as much practice as you need, as you can click the link at the top of the first question ("Try another version of these questions") to get a new set of questions. Practice until you feel comfortable doing the questions.

[ohm_question]152094-152095-152096-152097-152098-152099[/ohm_question]

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7.13: Patterns of Unemployment

Learning Objectives

- Explain historical patterns and trends of unemployment in the U.S.
- Evaluate global unemployment rates

The Historical U.S. Unemployment Rate

Let's look at how unemployment rates have changed over time and how various groups of people are affected by unemployment differently. Figure 1 shows the historical pattern of U.S. unemployment since 1948. While it clearly fluctuates over time, the unemployment rate seems to return to a range of 4% to 6%. There does not seem to be a long-term trend toward the rate moving generally higher or generally lower.

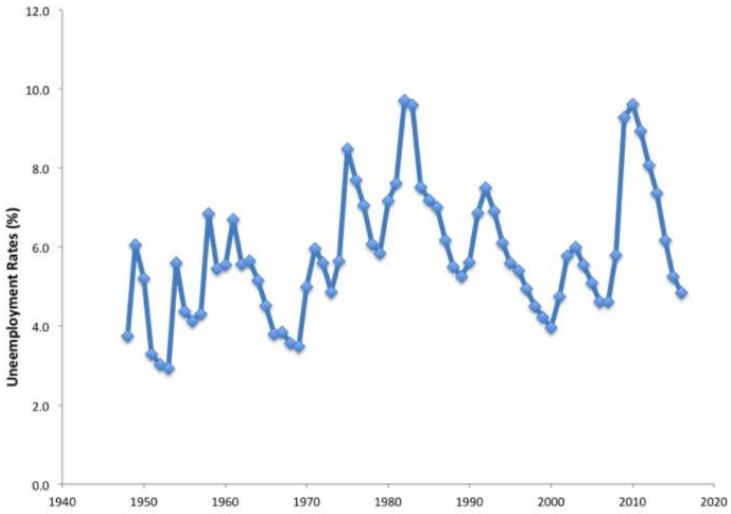


Figure 1. The U.S. Unemployment Rate, 1948–2016. The U.S. unemployment rate moves up and down as the economy moves in and out of recessions. (Source: www.census.gov/cps).

As we look at this data, several patterns stand out:

1. Unemployment rates do fluctuate over time. During the deep recessions of the early 1980s and of 2007–2009, unemployment reached roughly 10%. For comparison, during the Great Depression of the 1930s, the unemployment rate reached almost 25% of the labor force.
2. Unemployment rates in the late 1990s and into the mid-2000s were rather low by historical standards. The unemployment rate was below 5% from 1997 to 2000 and near 5% during almost all of 2006–2007. The previous time unemployment had been less than 5% for three consecutive years was three decades earlier, from 1968 to 1970. It has returned to this level in 2016.
3. The unemployment rate never falls all the way to zero. Indeed, it never seems to get below 3%—and it stays that low only for very short periods. (Reasons why this is the case will be discussed later.)
4. The timing of rises and falls in unemployment matches fairly well with the timing of upswings and downswings in the overall economy. During periods of recession and depression, unemployment is high. During periods of economic growth, unemployment tends to be lower.
5. No significant upward or downward trend in unemployment rates is apparent. This point is especially worth noting because the U.S. population nearly quadrupled from 76 million in 1900 to over 314 million by 2012. Moreover, a higher proportion of U.S. adults are now in the paid workforce, because women have entered the paid labor force in significant numbers in recent decades. Women composed 18% of the paid workforce in 1900 and nearly half of the paid workforce in 2012. But despite the increased number of workers, as well as other economic events like globalization and the continuous invention of new technologies, the economy has provided jobs without causing any long-term upward or downward trend in unemployment rates.

Unemployment Rates by Group

Unemployment is not distributed evenly across the U.S. population. Figure 2 shows unemployment rates broken down in various ways: by gender, age, and race/ethnicity.

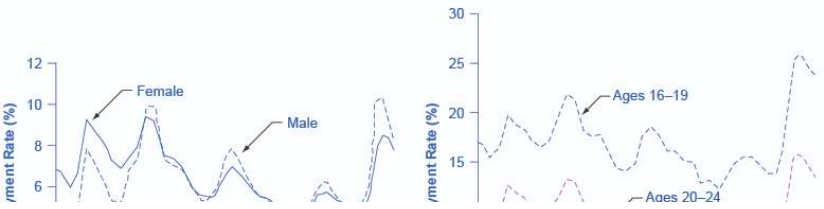


Figure 2.Unemployment Rate by Demographic Group.(a) By gender, 1972–2012. Unemployment rates for men used to be lower than unemployment rates for women, but in recent decades, the two rates have been very close, often with the unemployment rate for men somewhat higher. **(b) By age, 1972–2012.** Unemployment rates are highest for the very young and become lower with age. **(c) By race and ethnicity, 1972–2012**. Although unemployment rates for all groups tend to rise and fall together, the unemployment rate for whites has been lower than the unemployment rate for blacks and Hispanics in recent decades. (Source: www.census.gov/bls).

The unemployment rate for women had historically tended to be higher than the unemployment rate for men, perhaps reflecting the historical pattern that women were seen as "secondary" earners. By about 1980, however, the unemployment rate for women was essentially the same as that for men, as shown in 2(a). During the recession of 2008–2009, however, the unemployment rate climbed higher for men than for women.

LINK IT UP

Read this BLS report for detailed information on the recession of 2008–2009. It also provides some very useful information on the statistics of unemployment.

Younger workers tend to have higher unemployment, while middle-aged workers tend to have lower unemployment, probably because the middle-aged workers feel the responsibility of needing to have a job more heavily, in addition to having more experience. Younger workers move in and out of jobs (and in and out of the labor force) more easily. Elderly workers have extremely low rates of unemployment, because those who do not have jobs often exit the labor force by retiring, and thus are not counted in the unemployment statistics. Figure 2(b) shows unemployment rates for women divided by age; the pattern for men is similar.

The unemployment rate for African-Americans is substantially higher than the rate for other racial or ethnic groups, a fact that surely reflects, to some extent, a pattern of discrimination that has constrained blacks' labor market opportunities. However, the gaps between unemployment rates for whites and for blacks and Hispanics diminished in the 1990s, as shown in Figure 3(c). In fact, unemployment rates for blacks and Hispanics were at the lowest levels for several decades in the mid-2000s before rising during the recent Great Recession.

Finally, those with less education typically suffer higher unemployment. In early 2013, for example, the unemployment rate for those with a college degree was 3.7%; for those with some college but not a four-year degree, the unemployment rate was 6.0%; for high school graduates with no additional degree, the unemployment rate was 7.6%; and for those without a high school diploma, the unemployment rate was 10.3%. This pattern may arise because additional education offers better connections to the labor market and higher demand, or it may occur because the labor market opportunities for low-skilled workers are less attractive than the opportunities for the more highly-skilled. Because of lower pay, low-skilled workers may be less motivated to find jobs.

Breaking Down Unemployment in Other Ways

The Bureau of Labor Statistics also gives information about the reasons for being unemployed as well as the length of time individuals have been unemployed. Table 1, for example, shows the four reasons for being unemployed and the percentages of the unemployed that fall into each category.

Table 1. Reasons for Being Unemployed, May 2013

Reason	Percentage
New Entrants	10.8%
Re-entrants	28.5%
Job Leavers	8.1%
Job Losers: Temporary	8.5%
Job Losers: Non Temporary	44.1%

Table 2 shows the length of unemployment.

Table 2. Length of Unemployment, May 2013

Length of Time	Percentage
Under 5 weeks	23.2%
5 to 14 weeks	22.8%
15 to 26 weeks	16.7%
Over 27 weeks	37.3%

Link It Up

Just for fun, watch this Ted talk on the impact of droids on the labor market and what that means for the way we think about jobs.

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International Unemployment Comparisons

From an international perspective, the U.S. unemployment rate typically has looked a little better than average. Table 3 compares unemployment rates for 1991, 1996, 2001, 2006 (just before the recession), and 2011 (somewhat after the recession) from several other high-income countries.

Table 3. International Comparisons of Unemployment Rates

Country	1991	1996	2001	2006	2012
United States	6.8%	5.4%	4.8%	4.4%	8.1%
Canada	9.8%	8.8%	6.4%	6.2%	6.3%
Japan	2.1%	3.4%	5.1%	4.5%	3.9%
France	9.5%	12.5%	8.7%	10.1%	10.0%
Germany	5.6%	9.0%	8.9%	9.8%	5.5%
Italy	6.9%	11.7%	9.6%	7.8%	10.8%
Sweden	3.1%	9.9%	5.0%	5.2%	7.9%
United Kingdom	8.8%	8.1%	5.1%	5.5%	8.0%

However, cross-country comparisons of unemployment rates need to be treated with care, because each country has slightly different survey tools for measuring unemployment and also different labor markets. For example, Japan's unemployment rates appear quite low, but Japan's economy has been mired in slow growth and recession since the late 1980s, and Japan's unemployment rate probably paints too rosy a picture of its labor market. In Japan, workers who lose their jobs are often quick to exit the labor force and not look for a new job, in which case they are not counted as unemployed. In addition, Japanese firms are often quite reluctant to fire workers, and so firms have substantial numbers of workers who are on reduced hours or officially employed, but doing very little. This Japanese pattern is perhaps best viewed as an unusual method for society to provide support for the unemployed, rather than a sign of a healthy economy.

Comparing unemployment rates in the United States and other high-income economies with unemployment rates in Latin America, Africa, Eastern Europe, and Asia is very difficult. One reason is that the statistical agencies in many poorer countries lack the resources and technical capabilities of the U.S. Bureau of the Census. But a more difficult problem with international comparisons is that in many low-income countries, most workers are not involved in the labor market through an employer who pays them regularly. Instead, workers in these countries are engaged in short-term work, subsistence activities, and barter. Moreover, the effect of unemployment is very different in high-income and low-income countries. Unemployed workers in the developed economies have access to various government programs like unemployment insurance, welfare, and food stamps; such programs may barely exist in poorer countries. Although unemployment is a serious problem in many low-income countries, it manifests itself in a different way than in high-income countries.

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7.14: Introduction to Types of Unemployment

What you'll learn to do: examine causes and types of unemployment, including cyclical, frictional, structural, and natural unemployment



Workers become unemployed for different reasons, some of which are more problematic than others. Consider the following two examples, neither of which is considered a "layoff": a college student quits her part time job when she graduates from college to look for a career and a steel worker becomes replaced by an industrial robot. We typically don't see the former as a major social problem, but we often see the latter that way. What causes different types of unemployment and what government policies, if any, can help get those individuals back to work? These questions are what we'll consider next.

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7.15: Cyclical Unemployment

Learning Objectives

- Analyze cyclical unemployment
- Explain the relationship between sticky wages and employment using various economic arguments

Cyclical Unemployment

When people think of unemployment, most of the time they imagine a situation where the economy slows down and businesses respond to the decrease in demand for their products by reducing production and laying off workers. Let's explore this "cyclical" unemployment in more detail by considering the market for labor.

Firms hire labor because they need workers to produce their products. Workers supply labor in order to earn income. Together, these represent the demand for and supply of labor, as we explained briefly earlier in the module on supply and demand. Equilibrium in the **labor market** occurs at the wage rate where the quantity of labor demanded equals the quantity of labor supplied. The equilibrium wage rate and employment level are shown in Figure 1.

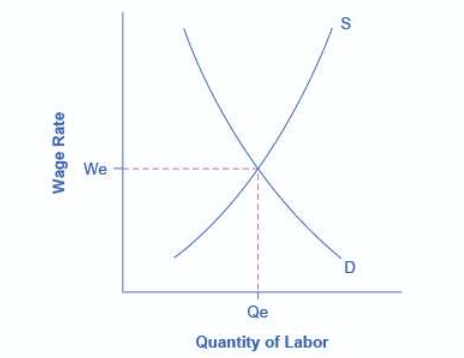


Figure 1. Equilibrium in the Labor Market. In a labor market with flexible wages, the equilibrium will occur at wage We and quantity Qe, where the number of people looking for jobs (shown by S) equals the number of jobs available (shown by D).

One primary determinant of the demand for labor from firms is how they perceive the state of the macro economy. If firms believe that business is expanding, then at any given wage they will desire to hire a greater quantity of labor, and the labor demand curve shifts to the right. (We assume that there is no substantial change in the age structure of the labor force, institutions and laws affecting the labor market, or other factors that might shift the supply curve for labor.)

Conversely, if firms perceive that the economy is slowing down or entering a recession, then they will wish to hire a lower quantity of labor at any given wage, and the labor demand curve will shift to the left. The variation in unemployment caused by the economy moving from expansion to recession or from recession to expansion (i.e. the business cycle) is known as **cyclical unemployment.**

From the standpoint of the supply-and-demand model of competitive and flexible labor markets, unemployment represents something of a puzzle. In a supply-and-demand model of a labor market, as illustrated in Figure 1, the labor market should move toward an equilibrium wage and quantity. At the equilibrium wage (We), the equilibrium quantity (Qe) of labor supplied by workers should be equal to the quantity of labor demanded by employers. In other words, there should be no unemployment.

One possibility for unemployment is that people who are unemployed are those who are not willing to work at the current equilibrium wage, say $10 an hour, but would be willing to work at a higher wage, like $20 per hour. The monthly Current Population Survey would count these people as unemployed, because they say they are ready and looking for work (at $20 per hour). But from an economist's point of view, these people are choosing to be unemployed. Probably a few people are unemployed because of unrealistic expectations about wages, but they do not represent the majority of the unemployed. Instead, unemployed people often have friends or acquaintances of similar skill levels who are employed, and the unemployed would be willing to work at the jobs and wages similar to what is being received by those people. But the employers of their friends and acquaintances do not seem to be hiring. In other words, these people are involuntarily unemployed. What causes **involuntary unemployment**?

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Why Wages Might Be Sticky Downward

Suppose that real world labor markets do not have perfectly flexible wages. In particular, even though wage increases may occur with relative ease, wage decreases are few and far between.

One set of reasons why wages may be "sticky downward," as economists put it, involves economic laws and institutions. For low-skilled workers being paid the **minimum wage**, it is illegal to reduce their wages. For union workers operating under a multiyear contract with a company, wage cuts might violate the contract and create a labor dispute or a strike. However, minimum wages and union contracts are not a sufficient reason why wages would be sticky downward for the U.S. economy as a whole. After all, out of the 150 million or so workers in the U.S. economy, only about 1.4 million—less than 2% of the total—are paid the minimum wage. Similarly, only 10.7% of American wage and salary workers were represented by a labor union in 2016. In other high-income countries, more workers may have their wages determined by unions or the minimum wage may be set at a level that applies to a larger share of workers. But for the United States, these two factors combined affect only about one-fifth or less of the labor force.

Economists looking for reasons why wages might be **sticky** downwards have focused on factors that may characterize most labor relationships in the economy, not just a few. A number of different theories have been proposed, but they share a common tone.

- One argument is that even employees who are not union members often work under an **implicit contract**, which is that the employer will try to keep wages from falling when the economy is weak or the business is having trouble, and the employee will not expect huge salary increases when the economy or the business is strong. This wage-setting behavior acts like a form of insurance: the employee has some protection against wage declines in bad times, but pays for that protection with lower wages in good times. Clearly, this sort of implicit contract means that firms will be hesitant to cut wages, lest workers feel betrayed and work less hard or even leave the firm.
- **Efficiency wage theory** argues that the productivity of workers depends on their pay, and so employers will often find it worthwhile to pay their employees somewhat more than market conditions might dictate. One reason is that employees who are paid better than others will be more productive because they recognize that if they were to lose their current jobs, they would suffer a decline in salary. As a result, they are motivated to work harder and to stay with the current employer. In addition, employers know that it is costly and time-consuming to hire and train new employees, so they would prefer to pay workers a little extra now rather than to lose them and have to hire and train new workers. Thus, by avoiding wage cuts, the employer minimizes costs of training and hiring new workers, and reaps the benefits of well-motivated employees.
- The **adverse selection of wage cutsargument** points out that if an employer reacts to poor business conditions by reducing wages for all workers, then the best workers, those with the best employment alternatives at other firms, are the most likely to leave. The least attractive workers, with fewer employment alternatives, are more likely to stay. Consequently, firms are more likely to choose which workers should depart, through layoffs and firings, rather than trimming wages across the board. Sometimes companies that are going through tough times can persuade workers to take a pay cut for the short term, and still retain most of the firm's workers. But these stories are notable because they are so uncommon. It is far more typical for companies to lay off some workers, rather than to cut wages for everyone.
- The **insider-outsider model** of the labor force, in simple terms, argues that those already working for firms are "insiders," while new employees, at least for a time, are "outsiders." A firm depends on its insiders to grease the wheels of the organization, to be familiar with routine procedures, to train new employees, and so on. However, cutting wages will alienate the insiders and damage the firm's productivity and prospects.
- Finally, the **relative wage coordinationargument** points out that even if most workers were hypothetically willing to see a decline in their own wages in bad economic times as long as everyone else also experiences such a decline, there is no obvious way for a decentralized economy to implement such a plan. Instead, workers confronted with the possibility of a wage cut will worry that other workers will not have such a wage cut, and so a wage cut means being worse off both in absolute terms and relative to others. As a result, workers fight hard against wage cuts.

These theories of why wages tend not to move downward differ in their logic and their implications, and figuring out the strengths and weaknesses of each theory is an ongoing subject of research and controversy among economists. All tend to imply that wages

will decline only very slowly, if at all, even when the economy or a business is having tough times. When wages are inflexible and unlikely to fall, then either short-run or long-run unemployment can result. This can be seen in Figure 2.

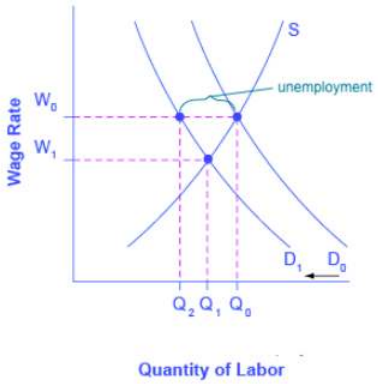


Figure 2. Falling Demand for Labor. In a labor market where wages do not decline, a fall in the demand for labor from D_0 to D_1 leads to a decline in the quantity of labor demanded at the original wage (W_0) from Q_0 to Q_2. These workers will want to work at the prevailing wage (W_0), but will not be able to find jobs.

From an initial equilibrium at W_0 and Q_0, suppose the demand for labor shifts to the left, from D_0 to D_1, as it would tend to do in a recession. Because wages are sticky downward, they do not adjust toward what would have been the new equilibrium wage (W_1), at least not in the short run. Instead, after the shift in the labor demand curve, the same quantity of workers is willing to work at that wage as before; however, the quantity of workers demanded at that wage has declined from the original equilibrium (Q_0) to Q_2. The gap between the original equilibrium quantity (Q_0) and the new quantity demanded of labor (Q_2) represents workers who would be willing to work at the going wage but cannot find jobs. In other words, the gap represents unemployment.

Contrast the previous situation with the opposite scenario where demand for labor increases as the economy expands. If the expansion follows a recession, then the demand for labor shifts from D_1 to D_0 in Figure 2, reducing the unemployment and returning the labor market to equilibrium at W_0 and Q_0. This analysis helps to explain the connection noted earlier: that cyclical unemployment tends to rise in recessions and to decline during expansions.

Figure 3 shows what happens if the economy continues to expand. The demand for labor shifts further right from D_0 to D_2, and the equilibrium quantity of labor hired increases from Q_0 to Q_2. Since wages are only sticky downward, the equilibrium wage rises from W_0 to W_2. It does not hurt employee morale at all for wages to rise.

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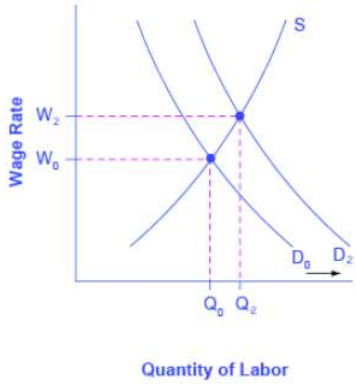


Figure 3. Rising Wage and Employment. In a labor market where wages are able to rise, an increase in the demand for labor from D_0 to

D_2 leads to an increase in equilibrium quantity of labor hired from Q_0 to Q_2 and a rise in the equilibrium wage from W_0 to W_2.

Watch It

Watch this video for an explanation of cyclical unemployment and to learn more about why wages are sticky.

An interactive or media element has been excluded from this version of the text. You can view it online here: http://pb.libretexts.org/mlum/?p=311

Glossary

[glossary-page][glossary-term]adverse selection of wage cuts argument:[/glossary-term][glossary-definition] if employers reduce wages for all workers, the best workers will leave[/glossary-definition][glossary-term]cyclical unemployment: [/glossary-term][glossary-definition]unemployment closely tied to the business cycle, like higher unemployment during a recession[/glossary-definition][glossary-term]efficiency wage theory: [/glossary-term][glossary-definition]the theory that the productivity of workers, either individually or as a group, will increase if they are paid more[/glossary-definition][glossary-term]implicit contract: [/glossary-term][glossary-definition]an unwritten agreement in the labor market that the employer will try to keep wages from falling when the economy is weak or the business is having trouble, and the employee will not expect huge salary increases when the economy or the business is strong[/glossary-definition][glossary-term] insider-outsider model: [/glossary-term][glossary-definition]those already working for the firm are “insiders” who know the procedures; the other workers are “outsiders” who are recent or prospective hires [/glossary-definition][glossary-term]relative wage coordination argument: [/glossary-term][glossary-definition]across-the-board wage cuts are hard for an economy to implement, and workers fight against them[/glossary-definition][/glossary-page]

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7.16: Frictional and Structural Unemployment

Learning Objectives

- Explain frictional unemployment
- Explain structural unemployment

Changes in Unemployment over the Long Run

Cyclical unemployment explains why unemployment rises during a recession and falls during an economic expansion. But what explains the remaining level of unemployment even in good economic times? Why is the unemployment rate never zero? Even when the U.S. economy is growing strongly, the unemployment rate only rarely dips as low as 4% (although it hovers around 4.2% in late 2017). Moreover, the discussion earlier in this module pointed out that unemployment rates in many European countries like Italy, France, and Germany have often been remarkably high at various times in the last few decades. Why does some level of unemployment persist even when economies are growing strongly? Why are unemployment rates continually higher in certain economies, through good economic years and bad? Economists have a term to describe the remaining level of unemployment that occurs even when the economy is healthy: it is called the **natural rate of unemployment**.

The Natural Rate of Unemployment

The natural rate of unemployment is not "natural" in the sense that water freezes at 32 degrees Fahrenheit or boils at 212 degrees Fahrenheit. It is not a physical and unchanging law of nature. Instead, it is only the "natural" rate because it is the unemployment rate that would result from the combination of economic, social, and political factors that exist at a time—assuming the economy was neither booming nor in recession. These forces include the usual pattern of companies expanding and contracting their workforces in a dynamic economy, social and economic forces that affect the labor market, or public policies that affect either the eagerness of people to work or the willingness of businesses to hire. Let's discuss these factors in more detail.

Frictional Unemployment

In a market economy some companies are always going broke for a variety of reasons: old technology; poor management; good management that happened to make bad decisions; shifts in tastes of consumers so that less of the firm's product is desired; a large customer who went broke; or tough domestic or foreign competitors. Conversely, other companies will be doing very well for just the opposite reasons and looking to hire more employees. In a perfect world, all of those who lost jobs would immediately find new ones. But in the real world, even if the number of job seekers is equal to the number of job vacancies, it takes time to find out about new jobs, to interview and figure out if the new job is a good match, or perhaps to sell a house and buy another in proximity to a new job. The unemployment that occurs in the meantime, as workers move between jobs, is called **frictional unemployment**. Frictional unemployment is not inherently a bad thing. It takes time on part of both the employer and the individual to match those looking for employment with the correct job openings. For individuals and companies to be successful and productive, you want people to find the job for which they are best suited, not just the first job offered.

In the mid-2000s, before the recession of 2008–2009, it was true that about 7% of U.S. workers saw their jobs disappear in any three-month period. But in periods of economic growth, these destroyed jobs are counterbalanced for the economy as a whole by a larger number of jobs created. In 2005, for example, there were typically about 7.5 million unemployed people at any given time in the U.S. economy. Even though about two-thirds of those unemployed people found a job in 14 weeks or fewer, the unemployment rate did not change much during the year, because those who found new jobs were largely offset by others who lost jobs. Thus, while *individuals* stay frictionally unemployed for relatively short periods of time, the size and dynamism of the labor market means that there is always a sizeable amount of frictional unemployment in the economy.

Of course, it would be preferable if people who were losing jobs could immediately and easily move into the new jobs being created, but in the real world, that is not possible. Someone who is laid off by a textile mill in South Carolina cannot turn around and immediately start working for a textile mill in California. Instead, the adjustment process happens in ripples. Some people find new jobs near their old ones, while others find that they must move to new locations. Some people can do a very similar job with a different company, while others must start new career paths. Some people may be near retirement and decide to look only for part-

time work, while others want an employer that offers a long-term career path. The frictional unemployment that results from people moving between jobs in a dynamic economy may account for one to two percentage points of total unemployment.

The level of frictional unemployment will depend on how easy it is for workers to learn about alternative jobs, which may reflect the ease of communications about job prospects in the economy. The extent of frictional unemployment will also depend to some extent on how willing people are to move to new areas to find jobs—which in turn may depend on history and culture.

Frictional unemployment and the natural rate of unemployment also seem to depend on the age distribution of the population. As we saw earlier, unemployment rates are typically lower for people between 25–54 years of age than they are for those who are either younger or older. “Prime-age workers,” as those in the 25–54 age bracket are sometimes called, are typically at a place in their lives when they want to have a job and income arriving at all times. But some proportion of those who are under 30 may still be trying out jobs and life options and some proportion of those over 55 are eyeing retirement. In both cases, the relatively young or old tend to worry less about unemployment than those in-between, and their periods of frictional unemployment may be longer as a result. Thus, a society with a relatively high proportion of relatively young or old workers will tend to have a higher unemployment rate than a society with a higher proportion of its workers in middle age.

Watch It

Watch this video to analyze frictional unemployment, why it occurs, and how it fluctuates over time.

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Structural Unemployment

Another factor that influences the natural rate of unemployment is the amount of **structural unemployment**. The structurally unemployed are individuals who have no jobs because they lack skills valued by the labor market, either because demand has shifted away from the skills they do have, or because they never learned any skills. An example of the former would be the unemployment among aerospace engineers after the U.S. space program downsized in the 1970s. An example of the latter would be high school dropouts. Structural unemployment is persistent, long term and difficult to reduce.

Some people worry that technology causes structural unemployment. In the past, new technologies have put lower skilled employees out of work, but at the same time they create demand for higher skilled workers to use the new technologies. Education seems to be the key in minimizing the amount of structural unemployment. Individuals who have degrees can be retrained if they become structurally unemployed. For people with no skills and little education, that option is more limited.

WAtch It

Watch the selected clip from this video to learn about how structural unemployment is both persistent and long-lasting. When major shocks occur, such as changes in technology or a crisis that causes a shift in the skills needed in the labor market, structural employment is often the result. This clip will explain how labor regulations in Europe have created a situation where structural unemployment is more prevalent in Europe than in the United States.

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Glossary

[glossary-page][glossary-term]frictional unemployment: [/glossary-term][glossary-definition]unemployment that occurs as workers move between jobs[/glossary-definition][glossary-term]natural rate of unemployment: [/glossary-term][glossary-definition]the unemployment rate that would exist in a growing and healthy economy from the combination of economic, social, and political factors that exist at a given time; the sum of frictional plus structural unemployment[/glossary-definition][glossary-term]structural unemployment: [/glossary-term][glossary-definition]unemployment that occurs because individuals lack skills valued by employers[/glossary-definition][/glossary-page]

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7.17: The Natural Rate of Unemployment

Learning Objectives

- Explain natural unemployment
- Assess relationships between the natural rate of employment and potential real GDP, productivity, and public policy

Natural Unemployment and Potential Real GDP

Let's close our introduction to unemployment with another look at the natural rate. The **natural rate of unemployment** is the unemployment rate that would exist in a growing and healthy economy. In other words, the natural rate of unemployment includes only frictional and structural unemployment, and not cyclical unemployment.

The natural rate of unemployment is related to two other important concepts: full employment and potential real GDP. The economy is considered to be at full employment when the actual unemployment rate is equal to the natural rate. When the economy is at full employment, real GDP is equal to potential real GDP. By contrast, when the economy is below full employment, the unemployment rate is greater than the natural unemployment rate and real GDP is less than potential. Finally, when the economy is above full employment, then the unemployment rate is less than the natural unemployment rate and real GDP is greater than potential. Operating above potential is only possible for a short while, since it is analogous to workers working overtime.

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https://assessments.lumenlearning.co...sessments/7488

Productivity Shifts and the Natural Rate of Unemployment

Unexpected shifts in productivity can have a powerful effect on the natural rate of unemployment. Over time, the level of wages in an economy will be determined by the productivity of workers. After all, if a business paid workers more than could be justified by their productivity, the business will ultimately lose money and go bankrupt. Conversely, if a business tries to pay workers less than their productivity then, in a competitive labor market, other businesses will find it worthwhile to hire away those workers and pay them more.

However, adjustments of wages to productivity levels will not happen quickly or smoothly. Wages are typically reviewed only once or twice a year. In many modern jobs, it is difficult to measure productivity at the individual level. For example, how precisely would one measure the quantity produced by an accountant who is one of many people working in the tax department of a large corporation? Because productivity is difficult to observe, wage increases are often determined based on recent experience with productivity; if productivity has been rising at, say, 2% per year, then wages rise at that level as well. However, when productivity changes unexpectedly, it can affect the natural rate of unemployment for a time.

The U.S. economy in the 1970s and 1990s provides two vivid examples of this process. In the 1970s, productivity growth slowed down unexpectedly. For example, output per hour of U.S. workers in the business sector increased at an annual rate of 3.3% per year from 1960 to 1973, but only 0.8% from 1973 to 1982. The interactive graph below (Figure 1) illustrates the situation where the demand for labor—that is, the quantity of labor that business is willing to hire at any given wage—has been shifting out a little each year because of rising productivity, from D_0 to D_1 to D_2. As a result, equilibrium wages have been rising each year from W_0 to W_1 to W_2. But when productivity unexpectedly slows down, the pattern of wage increases does not adjust right away. Wages keep rising each year from W_2 to W_3 to W_4. But the demand for labor is no longer shifting up. A gap opens where the quantity of labor supplied at wage level W_4 is greater than the quantity demanded. The natural rate of unemployment rises; indeed, in the aftermath of this unexpectedly low productivity in the 1970s, the national unemployment rate did not fall below 7% from May, 1980 until 1986. Over time, the rise in wages will adjust to match the slower gains in productivity, and the unemployment rate will ease back down. But this process may take years.

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Figure 1 (Interactive Graph): Productivity rises, and then stops rising

The late 1990s provide an opposite example: instead of the surprise decline in productivity in the 1970s, productivity unexpectedly rose in the mid-1990s. The annual growth rate of real output per hour of labor increased from 1.7% from 1980–1995, to an annual rate of 2.6% from 1995–2001. Let's simplify the situation a bit, so that the economic lesson of the story is easier to see graphically, and say that productivity had not been increasing at all in earlier years, so the intersection of the labor market was at point E in the interactive graph (Figure 2) below, where the demand curve for labor (D_0) intersects the supply curve for labor. As a result, real wages were not increasing. Now, productivity jumps upward, which shifts the demand for labor out to the right, from D_0 to D_1. At least for a time, however, wages are still being set according to the earlier expectations of no productivity growth, so wages do not rise. The result is that at the prevailing wage level (W), the quantity of labor demanded (Q_1) will for a time exceed the quantity of labor supplied (Q_0), and unemployment will be very low—actually below the natural level of unemployment for a time. This pattern of unexpectedly high productivity helps to explain why the unemployment rate stayed below 4.5%—quite a low level by historical standards—from 1998 until after the U.S. economy had entered a recession in 2001.

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Figure 2 (Interactive Graph): Productivity doesn't change, and then rises.

Average levels of unemployment will tend to be somewhat higher on average when productivity is unexpectedly low, and conversely, will tend to be somewhat lower on average when productivity is unexpectedly high. But over time, wages do eventually adjust to reflect productivity levels.

Public Policy and the Natural Rate of Unemployment

Public policy can also have a powerful effect on the natural rate of unemployment. On the supply side of the labor market, public policies to assist the unemployed can affect how eager people are to find work. For example, if a worker who loses a job is guaranteed a generous package of unemployment insurance, welfare benefits, food stamps, and government medical benefits, then the opportunity cost of being unemployed is lower and that worker will be less eager to seek a new job.

What seems to matter most is not just the amount of these benefits, but how long they last. A society that provides generous help for the unemployed that cuts off after, say, six months, may provide less of an incentive for unemployment than a society that provides less generous help that lasts for several years. Conversely, government assistance for job search or retraining can in some cases encourage people back to work sooner. Reference the following section to learn how the U.S. handles unemployment insurance.

HOW DOES U.S. UNEMPLOYMENT INSURANCE WORK?

Unemployment insurance is a joint federal–state program, established by federal law in 1935. The federal government sets minimum standards for the program, but most of the administration is done by state governments. The funding for the program is a federal tax collected from employers. The federal government requires that the tax be collected on the first $7,000 in wages paid to each worker; however, states can choose to collect the tax on a higher amount if they wish, and 41 states have set a higher limit. States can choose the length of time that benefits will be paid, although most states limit unemployment benefits to 26 weeks—with extensions possible in times of especially high unemployment. The fund is then used to pay benefits to those who become

unemployed. Average unemployment benefits are equal to about one-third of the wage earned by the person in his or her previous job, but the level of unemployment benefits varies considerably across states.

Bottom 10 States that pay the Lowest Benefit per Week		Top 10 States that pay the Highest Benefit per week	
Georgia	$330	Massachusetts	$653
South Carolina	$326	Washington	$604
Missouri	$320	New Jersey	$600
South Dakota	$295	Minnesota	$585
Florida	$275	Pennsylvania	$573
Tennessee	$275	Rhode Island	$566
Alabama	$265	Hawaii	$560
Louisiana	$258	Connecticut	$555
Arizona	$240	Ohio	$524
Mississippi	$235	Oregon	$507

Table 1. Average Weekly Unemployment Benefits by State in 2013(Source: jobsearch.about.com/od/unemployment/a/weekly-unemployment-benefits.htm)

One other interesting thing to note about the classifications of unemployment—an individual does not have to collect unemployment benefits to be classified as unemployed. While there are statistics kept and studied relating to how many people are collecting unemployment insurance, this is not the source of unemployment rate information.

On the demand side of the labor market, government rules social institutions, and the presence of unions can affect the willingness of firms to hire. For example, if a government makes it hard for businesses to start up or to expand, by wrapping new businesses in bureaucratic red tape, then businesses will become more discouraged about hiring. Government regulations can make it harder to start a business by requiring that a new business obtain many permits and pay many fees, or by restricting the types and quality of products that can be sold. Other government regulations, like zoning laws, may limit where business can be done, or whether businesses are allowed to be open during evenings or on Sunday.

Whatever defenses may be offered for such laws in terms of social value, these kinds of restrictions impose a barrier between some willing workers and other willing employers, and thus contribute to a higher natural rate of unemployment. Similarly, if government makes it difficult to fire or lay off workers, businesses may react by trying not to hire more workers than strictly necessary—since laying these workers off would be costly and difficult. High minimum wages may discourage businesses from hiring low-skill workers. Government rules may encourage and support powerful unions, which can then push up wages for union workers, but at a cost of discouraging businesses from hiring those workers.

The Natural Rate of Unemployment in Recent Years

The underlying economic, social, and political factors that determine the natural rate of unemployment can change over time, which means that the natural rate of unemployment can change over time, too. Estimates by economists of the natural rate of unemployment in the U.S. economy in the early 2000s run at about 4.5% to 5.5%. This is a lower estimate than earlier. Three of the common reasons proposed by economists for this change are outlined below.

1. The Internet has provided a remarkable new tool through which job seekers can find out about jobs at different companies and can make contact with relative ease. An Internet search is far easier than trying to find a list of local employers and then hunting up phone numbers for all of their human resources departments, requesting a list of jobs and application forms, and so on. Social networking sites such as LinkedIn have changed how people find work as well.

2. The growth of the temporary worker industry has probably helped to reduce the natural rate of unemployment. In the early 1980s, only about 0.5% of all workers held jobs through temp agencies; by the early 2000s, the figure had risen above 2%. Temp agencies can provide jobs for workers while they are looking for permanent work. They can also serve as a clearinghouse, helping workers find out about jobs with certain employers and getting a tryout with the employer. For many workers, a temp job is a stepping-stone to a permanent job that they might not have heard about or gotten any other way, so the growth of temp jobs will also tend to reduce frictional unemployment.
3. The aging of the "baby boom generation"—the especially large generation of Americans born between 1946 and 1963—meant that the proportion of young workers in the economy was relatively high in the 1970s, as the boomers entered the labor market, but is relatively low today. As noted earlier, middle-aged workers are far more likely to keep steady jobs than younger workers, a factor that tends to reduce the natural rate of unemployment.

The combined result of these factors is that the natural rate of unemployment was on average lower in the 1990s and the early 2000s than in the 1980s. The Great Recession of 2008–2009 pushed monthly unemployment rates above 10% in late 2009. But by late 2015, the unemployment rate was back to 5%.

The Natural Rate of Unemployment in Europe

By the standards of other high-income economies, the natural rate of unemployment in the U.S. economy appears relatively low. Through good economic years and bad, many European economies have had unemployment rates hovering near 10%, or even higher, since the 1970s. European rates of unemployment have been higher not because recessions in Europe have been deeper, but rather because the institutional conditions underlying supply and demand for labor have been different in Europe, in a way that has created a much higher natural rate of unemployment, as you saw in the video on structural unemployment.

Many European countries have a combination of generous welfare and unemployment benefits, together with rules that impose additional costs on businesses when they hire. In addition, many countries have laws that require firms to give workers months of notice before laying them off and to provide substantial severance or retraining packages after laying them off. The legally required notice before laying off a worker can be more than three months in Spain, Germany, Denmark, and Belgium, and the legally required severance package can be as high as a year's salary or more in Austria, Spain, Portugal, Italy, and Greece. Such laws will surely discourage laying off or firing current workers. But when companies know that it will be difficult to fire or lay off workers, they also become hesitant about hiring in the first place.

The typically higher levels of unemployment in many European countries in recent years, which have prevailed even when economies are growing at a solid pace, are attributable to the fact that the sorts of laws and regulations that lead to a high natural rate of unemployment are much more prevalent in Europe than in the United States.

A Preview of Policies to Fight Unemployment

We will discuss more details about how to fight unemployment in future modules, but let's take a quick look at the main issues concerning policies to fight unemployment.

The remedy for unemployment will depend on the diagnosis. Cyclical unemployment is a short-term problem, caused because the economy is in a recession. Thus, the preferred solution will be to avoid or minimize recessions. This policy can be enacted by stimulating aggregate (or total) demand in the economy, so that firms perceive that sales and profits are possible, which makes them eager to hire.

Dealing with the natural rate of unemployment is trickier. There is not much to be done about the fact that in a market-oriented economy, firms will hire and fire workers. Nor is there much to be done about how the evolving age structure of the economy, or unexpected shifts in productivity, will affect the natural rate of unemployment for a time. However, as the example of high ongoing unemployment rates for many European countries illustrates, government policy clearly can affect the natural rate of unemployment that will persist even when GDP is growing.

Structural unemployment is particularly difficult to address. For skilled workers who have become structurally unemployed, they could seek retraining for jobs that are in demand. For unskilled workers, e.g. high school dropouts, the prospects are worse. Government programs exist for retraining workers, or for basic adult education (e.g. the GED or General Education Diploma), but such programs have had mixed results at returning people to the work force.

When a government enacts policies that will affect workers or employers, it must examine how these policies will affect the information and incentives employees and employers have to seek each other out. For example, the government may have a role to play in helping some of the unemployed with job searches. The design of government programs that offer assistance to unemployed workers and protections to employed workers may need to be rethought so that they will not unduly discourage the supply of labor. Similarly, rules that make it difficult for businesses to begin or to expand may need to be redesigned so that they will not unduly discourage the demand for labor. The message is not that all laws affecting labor markets should be repealed, but only that when such laws are enacted, a society that cares about unemployment will need to consider the tradeoffs involved.

Try It

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https://assessments.lumenlearning.co...sessments/7490

Watch It

Watch this short clip to review the concept of natural unemployment. (Note that the video will only play a selected clip within the video from the five- to seven-minute mark).

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THE MYSTERIOUS CASE OF THE MISSING CANDIDATES

After reading the module you might think the current unemployment conundrum may be due to structural unemployment. Indeed, there is a mismatch between the skills employers are seeking and the skills the unemployed possess. But Peter Cappelli has a slightly different view on this—it is called the purple squirrel. The what?

In human resource parlance, a purple squirrel is a job candidate who is a perfect fit for all of the many different responsibilities of a position. A purple squirrel candidate could step into a multi-faceted position with no training and permit the firm to higher fewer people because the worker is so versatile. During the Great Recession, Human Resources (HR) positions were reduced. This means today's hiring managers are drafting job descriptions and requirements without much, if any HR feedback. "It turns out it's typically the case that employers' requirements are crazy, they're not paying enough, or their applicant screening is so rigid that nobody gets through," Cappelli stated in a 2012 Knowledge@Wharton interview about the findings in his book, *Why Good People Can't Find Jobs: Chasing After the Purple Squirrel*. In short, managers are searching for "purple squirrels" when what they really need are just versatile workers. There really is not a shortage of "normal squirrels"—candidates who are versatile workers. The managers just cannot find them because their requirements, screening processes, and compensation will filter out all but the "purple" ones.

Glossary

[glossary-page]
[glossary-term]frictional unemployment: [/glossary-term]
[glossary-definition]unemployment that occurs as workers move between jobs[/glossary-definition]
[glossary-term]natural rate of unemployment: [/glossary-term]
[glossary-definition]the unemployment rate that would exist in a growing and healthy economy from the combination of economic, social, and political factors that exist at a given time; the sum of frictional plus structural unemployment[/glossary-definition]
[glossary-term]structural unemployment: [/glossary-term]
[glossary-definition]unemployment that occurs because individuals lack skills valued by employers[/glossary-definition]
[/glossary-page]

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7.18: Introduction to Inflation

What you'll learn to do: define inflation and explain how the rate of inflation is calculated



Figure 1. This vintage Coke vending machine is still operating, as of 2009, in the back of a hardware store. The machine vends 8 oz glass bottles of Coke. There are no flavor options or user controls. When you've put in enough money, a coke comes out. Note how the price is still set at $0.75.

Like GDP and unemployment, inflation is an important measure of the state of the economy. You may not be aware of this, since inflation has not been a significant economic problem in the U.S. since the mid-1980s. What is inflation? It is a sustained, generalized increase in the prices of goods & services. Inflation erodes the value of money and financial assets. The value of money depends on what it will buy. As prices go up, the purchasing power of money declines. The value of your bank balance also decreases since with higher prices, it takes more money to purchase the same quantity of goods and services.

In this section, you'll learn about what inflation is, how it is measured, and how it affects the economy.

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7.19: Inflation

Learning Objectives

- Define and give examples of inflation

Inflation is a sustained, generalized increase in the prices of goods and services in an economy. Every increase in price is not inflation, though. When the prices of produce rise in the winter, we don't call this inflation, because prices will come back down in the spring. The price increase is not a sustained (or permanent) increase. Similarly, if prices increase one time, but don't continue increasing, we don't call it inflation. Inflation must be a sustained increase in prices. When the price of gasoline increases at the pump, we don't call this inflation either, since gasoline is only one good that we consume. Rather, we call this a change in relative prices, since gasoline has become more expensive relative to other goods and services. A generalized increase in prices means the prices of all, or at least most, goods and services go up.

Inflation can be so low that people don't pay any attention to it, as has been the case for the U.S. over recent decades. It can be moderate, where people pay attention to inflation and change their economic behavior because of it. This was the case for the U.S. during the 1970s. Inflation can also be so high that it causes significant problems in the working of the economy. A particularly extreme case of high inflation is called hyperinflation. Hyperinflation occurred in post-WWI Germany (then the Weimar Republic). Stories have it that the money became so worthless, even thieves would steal a basket but leave the hundreds of bills inside the basket untouched. Read the following feature for another example of hyperinflation.

A $550 Million Loaf of Bread?

If you were born within the last three decades in the United States, Canada, or many other countries in the developed world, you probably have no real experience with a high rate of inflation. Inflation is when most prices in an entire economy are rising. But there is an extreme form of inflation called hyperinflation. This occurred in Germany between 1921 and 1928, and more recently in Zimbabwe between 2008 and 2009. In November of 2008, Zimbabwe had an inflation rate of 79.6 billion percent. In contrast, in 2012, the United States had an average annual rate of inflation of 2.1%.



Figure 1. Big Bucks in Zimbabwe. This bill was worth 100 billion Zimbabwean dollars when issued in 2008. There were even bills issued with a face value of 100 trillion Zimbabwean dollars. The bills had $100,000,000,000,000 written on them. Unfortunately, they were almost worthless. Eventually, the country abandoned its own currency and allowed foreign currency to be used for purchases. (Credit: modification of work by Samantha Marx/Flickr Creative Commons)

Zimbabwe's inflation rate was so high it is difficult to comprehend. So, let's put it into context. It is equivalent to price increases of 98% per day. This means that, from one day to the next, prices essentially double. What is life like in an economy afflicted with hyperinflation? Not like anything you are familiar with. Prices for commodities in Zimbabwean dollars were adjusted several times *each day*. There was no desire to hold on to currency since it lost value by the minute. The people there spent a great deal of time getting rid of any cash they acquired by purchasing whatever food or other commodities they could find. At one point, a loaf of bread cost 550 million Zimbabwean dollars. Teachers were paid in the trillions a month; however this was equivalent to only one U.S. dollar a day. At its height, it took 621,984,228 Zimbabwean dollars to purchase one U.S. dollar.

Government agencies had no money to pay their workers so they started printing money to pay their bills rather than raising taxes. Rising prices caused the government to enact price controls on private businesses, which led to shortages and the emergence of black markets. In 2009, the country abandoned its currency and allowed foreign currencies to be used for purchases.

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How does this happen? How can both government and the economy fail to function at the most basic level? Before we consider these extreme cases of hyperinflation, let's first look at inflation itself.

Inflation has consequences for economic agents throughout the economy. Lenders and borrowers, wage-earners, taxpayers, and consumers may all be affected. But before we get into the details, we first need to understand how inflation is measured.

Tracking Inflation

Dinner table conversations where you might have heard about inflation usually entail reminiscing about when "everything seemed to cost so much less. You used to be able to buy three gallons of gasoline for a dollar and then go see an afternoon movie for another dollar." Table 1 compares some prices of common goods in 1970 and 2014. Of course, the average prices shown in this table may not reflect the prices where you live. The cost of living in New York City is much higher than in Houston, Texas, for example. In addition, many products have improved over recent decades. A new car in 2014, loaded with antipollution equipment, safety gear, computerized engine controls, and many other technological advances, is a more advanced machine (and more fuel efficient) than your typical 1970s car, so older and more recent products are not completely comparable. However, put details like these to one side for the moment, and look at the overall pattern. The primary reason behind the price rises in Table 1—and all the price increases for the other products in the economy—is not specific to the market for housing or cars or gasoline or movie tickets. Instead, it is part of a general rise in the level of all prices. In 2014, $1 had about the same purchasing power in overall terms of goods and services as 18 cents did in 1972, because of the amount of inflation that has occurred over that time period.

Table 1. Price Comparisons, 1970 and 2014

Items	1970	2014
Pound of ground beef	$0.66	$4.16
Pound of butter	$0.87	$2.93
Movie ticket	$1.55	$8.17
Sales price of new home (median)	$22,000	$280,000
New car	$3,000	$32,531
Gallon of gasoline	$0.36	$3.36
Average hourly wage for a manufacturing worker	$3.23	$19.55
Per capita GDP	$5,069	$53,041.98

Moreover, the power of inflation does not affect just goods and services, but wages and income levels, too. The second-to-last row of Table 1 shows that the average hourly wage for a manufacturing worker increased nearly six-fold from 1970 to 2012. Sure, the average worker in 2012 was better educated and more productive than the average worker in 1970—but not six times more productive. Sure, per capita GDP increased substantially from 1970 to 2012, but is the average person in the U.S. economy really more than eight times better off in just 42 years? Not likely.

A modern economy has millions of goods and services whose prices are continually quivering in the breezes of supply and demand. How can all of these shifts in price be boiled down to a single inflation rate? As with many problems in economic measurement, the conceptual answer is reasonably straightforward: Prices of a variety of goods and services are combined into a single price level (or price index); the inflation rate is simply the percentage change in the price level. Applying the concept, however, involves some practical difficulties to which we now turn.

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Glossary

[glossary-page][glossary-term]hyperinflation: [/glossary-term]
[glossary-definition]an extremely high rate of inflation, in the 100s or 1000s percent per year [/glossary-definition][glossary-term]inflation: [/glossary-term][glossary-definition]a general and ongoing rise in the level of prices in an economy[/glossary-definition][/glossary-page]

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7.20: Calculating Inflation with Index Numbers

Learning Objectives

- Explain what a price index is and how to compute one
- Calculate inflation rates using price indices

The Price of a Basket of Goods



Figure 1. A literal market basket of goods.

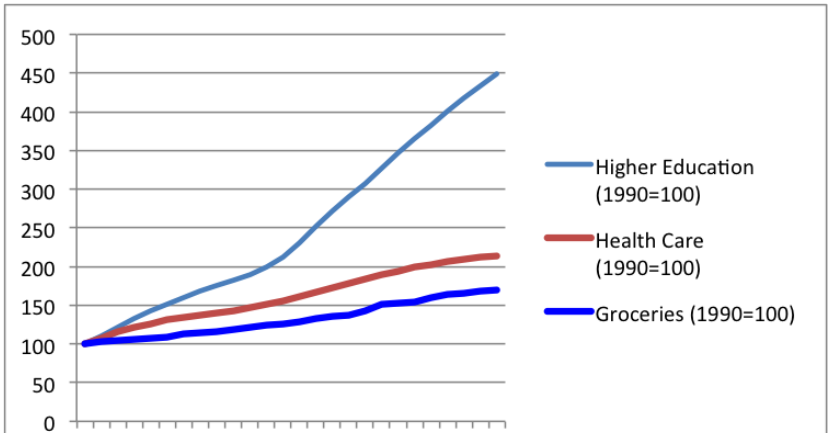
If inflation is the percentage change of the price level, what is the "price level"? When economists talk about the **price level**, what they mean is the average level of prices. To calculate the price level**,** they begin with the concept of a **market basket of goods and services**. Imagine a weekly trip to the grocery store. Think about the items you place in your shopping cart (or basket) to buy. That is your market basket. More formally, when economists talk about a market basket of goods and services, they are referring to the different items individuals, businesses, or organizations typically buy.

The next step is to identify the prices of those items, and create a weighted average of the prices. Changes in the prices of goods for which people spend a larger share of their incomes will matter more than changes in the prices of goods for which people spend a smaller share of their incomes. For example, an increase of 10% in the rental rate on housing matters more to most people than whether the price of carrots rises by 10%. To construct an overall measure of the price level, economists compute a weighted average of the prices of the items in the basket, where the weights are based on the actual quantities of goods and services people buy.

Index Numbers

The numerical results of a calculation based on a basket of goods can get a little messy. To simplify the task, the price level in each period is typically reported as an **index number**, rather than as the dollar amount for buying the basket of goods. Index numbers are unit-free measures of economic indicators. Index numbers are based on a value of 100, which makes it easy to measure percent changes. We'll explain this shortly.

Index numbers for prices are called **price indices**. A price index is essentially the weighted average of prices of a certain type of good or service. Price indices can measure a narrow range of goods and services or a broader range of goods and services. There are price indices for restaurant meals, for groceries, for consumer goods and services, or for everything included in GDP. Figure 2 shows price indices for U.S. higher education, healthcare and groceries, for the period 1990-2015, which are computed by the Bureau of Economic Analysis in the U.S. Commerce Department. Each price index has a base year of 1990 and increases over time. The price index for groceries increased by 70% over the 25-year period. You can see this since the price index increased from a value of 100 in 1990 to a value of 170 in 2015. The price index for healthcare increased by 213% over the same period, and the price index for higher education, which includes tuition, room, board, textbooks and other fees, increased nearly 450% over the period.



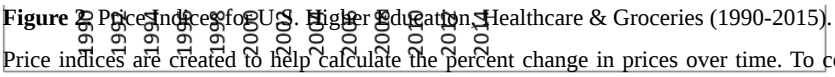


Figure 2. Price Indices for U.S. Higher Education, Healthcare & Groceries (1990-2015).

Price indices are created to help calculate the percent change in prices over time. To convert the money spent on the basket to a price index, economists arbitrarily choose one year to be the **base year**, or starting point from which we measure changes in prices. The base year, by definition, has an index value equal to 100. This sounds complicated, but it is really a simple math trick.

Let's look at a simple example.

Calculating a Price index

Suppose we look at a simple basket of goods consisting of hamburgers, aspirin and movie tickets, three items that a college student might buy. Say that in any given month, a college student typically purchases 20 hamburgers, one bottle of aspirin, and five movies. Prices for these items over four years are given below. Prices of some goods in the basket may rise while others fall. In this example, the price of aspirin does not change over the four years, while movies increase in price and hamburgers bounce up and down. Each year, the cost of buying the given basket of goods at the prices prevailing at that time is shown.

To calculate the price index in this example, first compute how much money is spent on each good in Year 1.

Year 1	Amount	Price	Total
Hamburgers	20	$3	$60
Aspirin	1	$10	$10
Movies	5	$6	$30

Next compute the total cost of the market basket in Year 1:

$$\$60 + \$10 + \$30 = \$100$$

Next, do the same computations for Years 2 through 4.

Year 2	Amount	Price	Total
Hamburgers	20	$3.20	$64
Aspirin	1	$10	$10
Movies	5	$6.50	$32.50

Total cost of the market basket in Year 2:

$$\$64 + \$10 + \$32.50 = \$106.50$$

Year 3	Amount	Price	Total
Hamburgers	20	$3.10	$62
Aspirin	1	$10	$10
Movies	5	$7	$35

Total cost of the market basket in Year 3:

$$\$62 + \$10 + \$35 = \$107$$

Year 4	Amount	Price	Total
Hamburgers	20	$3.50	$64
Aspirin	1	$10	$10
Movies	5	$7.50	$37.50

Total cost of the market basket in Year 4:

$$\$70 + \$10 + \$37.50 = \$117.50$$

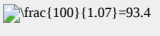
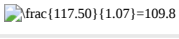
These computations are summarized in Table 1.

Table 1. A College Student's Basket of Goods

Items	Hamburger	Aspirin	Movies	Total Cost of Market Basket
Qty	20	1 bottle	5	—
Year 1 Price	$3.00	$10.00	$6.00	—
Year 1 Amount Spent	$60.00	$10.00	$30.00	$100.00
Year 2 Price	$3.20	$10.00	$6.50	—
Year 2 Amount Spent	$64.00	$10.00	$32.50	$106.50
Year 3 Price	$3.10	$10.00	$7.00	—
Year 3 Amount Spent	$62.00	$10.00	$35.00	$107.00
Year 4 Price	$3.50	$10.00	$7.50	—
Year 4 Amount Spent	$70.00	$10.00	$37.50	$117.50

Now, the total cost of the market basket in each year is not quite a price index, because we haven't established a base year. Say that Year 3 is chosen as the base year. Since the total amount of spending in that year is $107, we divide that amount by itself ($107) and multiply by 100. Mathematically, that is equivalent to dividing $107 by 100, or $1.07. Doing either will give us a value for the price index in the base year of 100. Again, this is because the index number in the base year *always* has to have a value of 100. Then, to figure out the values of the price index for the other years, we divide the dollar amounts for the other years by 1.07 as well. Note also that the dollar signs cancel out so that price indices have no units. Calculations for the other values of the price index, based on the example presented in Table 1 are shown in Table 2.

Table 2. Calculating Price Indices When Year 3 is the Base Year

	Total Spending	Price Index
Year 1	$100	
Year 2	$106.50	
Year 3	$107	
Year 4	$117.50	

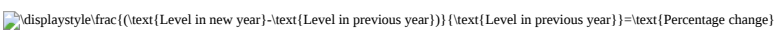
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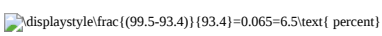
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From Price Indices to Inflation Rates

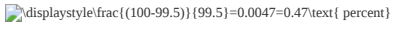
An inflation rate is just the percentage change in a price index. An inflation rate can be computed for any price index using the general equation for percentage changes between two years, whether in the context of inflation or in any other calculation:



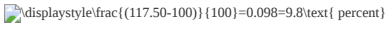
From Year 1 to Year 2, the price index in Table 2 rises from 93.4 to 99.5. Therefore, the percentage change over this time—the inflation rate—is:



From Year 2 to Year 3, the price rises from 99.5 to 100. Thus, the inflation rate over this time, again calculated by the percentage change, is approximately:



From Year 3 to Year 4, the overall cost rises from 100 to 109.8. The inflation rate is thus:



These calculations are summarized in Table 3.

Table 3. Calculating the Inflation Rate from the Price index		
	Price index	Inflation Rate
Year 1	93.4	
Year 2	99.5	$\frac{(99.5-93.4)}{93.4}=0.065=6.5\text{ percent}$
Year 3	100	$\frac{(100-99.5)}{99.5}=0.0047=0.47\text{ percent}$
Year 4	109.8	$\frac{(117.50-100)}{100}=0.098=9.8\text{ percent}$

This calculation of the change in the total cost of purchasing a basket of goods takes into account how much is spent on each good. The result is equivalent to creating a weighted average of the prices of the three items, with the weights being the percentage of the college student's budget made up by each item. The inflation rate, then, is the percentage change each year in the weighted average of prices.

Closing Thoughts on Price Indices

Three points to remember: first, the inflation rate is the same whether it is based on dollar values or price indices, so then why bother with the price indices?

The inflation calculations we performed above were all based off the the price indices. For example, in year three the inflation rate was calculated this way:

$$\frac{(100-99.5)}{99.5}=0.0047=0.47\text{ percent}$$

Note that we could also get to this number by computing inflation rates as the percent change over time in the cost of the market basket. For example, from period 2 to period 3, the overall change in the cost of purchasing the basket rises from $106.50 to $107. Thus, the inflation rate over this time, calculated by the percentage change, is approximately:

$$\frac{(107-106.50)}{106.50}=0.0047=0.47\text{ percent}$$

The advantage of using price indices over the costs of the market basket is that indexing allows easier eyeballing of the inflation numbers. If you glance at two annual values for a price index like 107 and 110, you know automatically that the rate of inflation between the two years is about, but not quite exactly equal to, 3%. By contrast, imagine that the price levels were expressed in absolute dollars of a large basket of goods, so that when you looked at the data, the numbers were $19,493.62 and $20,009.32. Most people find it difficult to eyeball those kinds of numbers and say that it is a change of about 3%. However, the two numbers expressed in dollars are exactly in the same proportion of 107 to 110 as the previous example. If you're wondering why simple subtraction of the index numbers wouldn't work, read the following feature.

Why do you not just subtract index numbers?

A word of warning: when a price index moves from, say, 107 to 110, the rate of inflation is not *exactly* 3%. Remember, the inflation rate is not derived by subtracting the index numbers, but rather through the percentage-change calculation. The precise inflation rate as the price index moves from 107 to 110 is calculated as (110 – 107)/107 = 0.028 = 2.8%. When the base year is fairly close to 100, a quick subtraction is not a terrible shortcut to calculating the inflation rate—but when precision matters down to tenths of a percent, subtracting will not give the right answer.

Second, index numbers have no dollar signs or other units attached to them. Although price index numbers are used to calculate a percentage inflation rate, the index numbers themselves do not have percentage signs. Index numbers just mirror the proportions found in other data. They transform the other data so that the data are easier to work with.

Third, the choice of a base year for the index number—that is, the year that is automatically set equal to 100—is arbitrary. It is chosen as a starting point from which changes in prices are tracked. In the official inflation statistics, it is common to use one base year for a few years, and then to update it, so that the base year of 100 is relatively close to the present. But any base year that is chosen for the index numbers will result in exactly the same inflation rate. To see this in the previous example (Table 1), imagine that Year 1, when total spending was $100, was also chosen as the base year, and given an index number of 100. At a glance, you can see that the index numbers would now exactly match the dollar figures, the inflation rate in the first period would be 6.5%, and so on.

Watch It

Watch the four minute clip from this video to review the distinction between price indices and inflation rates.

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Glossary

[glossary-page][glossary-term]base year: [/glossary-term]
[glossary-definition]arbitrary year whose value as an index number is defined as 100; inflation from the base year to other years can easily be seen by comparing the index number in the other year to the index number in the base year—i.e., 100; so, if the index number for a year is 105, then there has been exactly 5% inflation between that year and the base year[/glossary-definition][glossary-term]index number[/glossary-term][glossary-definition]a unit-free measure of an economic indicators; index numbers are based on a value of 100, which makes it easy to measure percent changes[/glossary-definition][glossary-term]Inflation rate: [/glossary-term][glossary-definition]The percentage change in some price index[/glossary-definition][glossary-term]market basket: [/glossary-term][glossary-definition]hypothetical collection of goods and services (or more precisely, the quantities of each good or service) consumers typically buy[/glossary-definition][glossary-term]price indices: [/glossary-term][glossary-definition]essentially the weighted average of prices of a certain type of good or service; price indices are created to calculate the inflation rate, i.e. the percent change in prices over time[/glossary-definition][glossary-term]price level: [/glossary-term][glossary-definition]the average level of prices[/glossary-definition] [/glossary-page]

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7.21: Learn By Doing- Calculating Inflation with Index Numbers

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These questions allow you to get as much practice as you need, as you can click the link at the top of the first question ("Try another version of these questions") to get a new set of questions. Practice until you feel comfortable doing the questions.

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7.22: The Consumer Price Index

Learning Objectives

- Use the Consumer Price Index (CPI) to calculate U.S. inflation rates

Now that we understand the mechanics of price indices and inflation rates, let's look at the most commonly used price indices in the real world. In this section we will discuss the consumer price index. In subsequent sections we will examine the GDP deflator, the producer price index and others.

The most well known price index in the United States is the **Consumer Price Index (CPI)**. When the rate of inflation is announced in the media, that rate is usually the percent change in the CPI. The CPI is calculated by government statisticians at the U.S. Bureau of Labor Statistics based on the prices in a fixed basket of goods and services that represents the purchases of the average family of four.

HOW DO U.S. GOVERNMENT STATISTICIANS MEASURE THE CONSUMER PRICE INDEX?

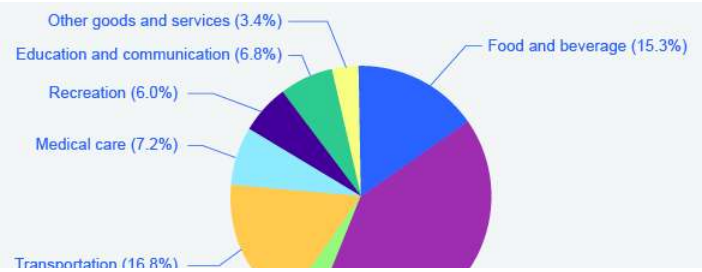
When the U.S. Bureau of Labor Statistics (BLS) calculates the Consumer Price Index, the first task is to decide on a basket of goods that is representative of the purchases of the average household. This is done by using the Consumer Expenditure Survey, a national survey of about 7,000 households, which provides detailed information on spending habits. Consumer expenditures are broken up into eight major groups, which in turn are broken up into more than 200 individual item categories. The BLS currently uses 1982–1984 as the base period.

The Eight Major Categories in the Consumer Price Index

1. Food and beverages (breakfast cereal, milk, coffee, chicken, wine, full-service meals, and snacks)
2. Housing (renter's cost of housing, homeowner's cost of housing, fuel oil, bedroom furniture)
3. Apparel (men's shirts and sweaters, women's dresses, jewelry)
4. Transportation (new vehicles, airline fares, gasoline, motor vehicle insurance)
5. Medical care (prescription drugs and medical supplies, physicians' services, eyeglasses and eye care, hospital services)
6. Recreation (televisions, cable television, pets and pet products, sports equipment, admissions)
7. Education and communication (college tuition, postage, telephone services, computer software and accessories)
8. Other goods and services (tobacco and smoking products, haircuts and other personal services, funeral expenses)

For each of the 200 individual expenditure items, the BLS chooses several hundred very specific examples of that item and looks at the prices of those examples. So, in figuring out the "breakfast cereal" item under the overall category of "foods and beverages," the BLS picks several hundred examples of breakfast cereal. One example might be the price of a 24-oz. box of a particular brand of cereal sold at a particular store. The specific products and sizes and stores chosen are statistically selected to reflect what people buy and where they shop. The basket of goods in the Consumer Price Index thus consists of about 80,000 products; that is, several hundred specific products in over 200 broad-item categories. About one-quarter of these 80,000 specific products are rotated out of the sample each year, and replaced with a different set of products.

The next step is to collect data on prices. Data collectors visit or call about 23,000 stores in 87 urban areas all over the United States every month to collect prices on these 80,000 specific products. A survey of 50,000 landlords or tenants is also carried out to collect information about rents. The Consumer Price Index is then calculated by taking the 80,000 prices of individual products and combining them, using weights (as shown in Figure 1) determined by the quantities of these products that people buy and allowing for factors like substitution between goods and quality improvements, into price indices for the 200 or so overall items. Then, the price indices for the 200 items are combined into an overall Consumer Price Index.



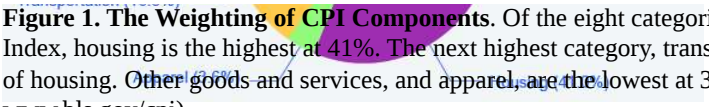
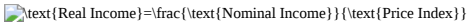


Figure 1. The Weighting of CPI Components. Of the eight categories used to generate the Consumer Price Index, housing is the highest at 41%. The next highest category, transportation at 16.8%, is less than half the size of housing. Other goods and services, and apparel, are the lowest at 3.4% and 3.6%, respectively. (Source: www.bls.gov/cpi)

Application: How Changes in the Cost of Living are Measured

Price indices are often used to measure the cost of living. Suppose you have just graduated from college and you are offered a job in San Francisco at a starting salary of $75,000 per year. That sounds fantastic, but since you've studied macroeconomics, you understand that what matters is not your nominal salary, but rather your real income, the purchasing power of your salary adjusted for the cost of living. Computing your real income is straightforward if you have a price index for goods and services you would spend your paycheck on if you lived in San Francisco. As we showed in the last module when solving for real GDP, real measurements are nominal measurements divided by the appropriate price index.



What price index should you use? While the BLS reports a generic (nationwide) CPI, it also publishes Consumer Price Indices for major regions of the country and also for major metropolitan areas, including San Francisco. The CPI for the San Francisco area would be the best price index for figuring out the real purchasing power of a salary in that city.

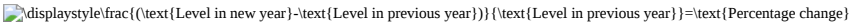
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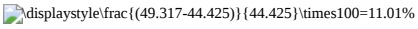
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Watch It

Recall that we can solve for the rate of inflation by calculating the percentage change in the consumer price index over a percentage of time:



In this video, you'll see an example of the consumer price index from the FRED database. If we look at data from 1973, the CPI was 44.425. In 1974, the average price of the CPI basket rose to 49.317. So what is the rate of inflation?



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glossary

[glossary-page][glossary-term]Consumer Price Index: [/glossary-term]
[glossary-definition]the average price of the goods and services typically purchased by urban consumers[/glossary-definition]
[/glossary-page]

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7.23: Shortcomings of the Consumer Price Index as a Measure of the Cost of Living

Learning Objectives

- Identify the major shortcomings of the CPI as a measure of the cost of living
- Explain how the substitution bias and the quality improvement/new goods bias causes the CPI to overstate the cost of living

Shortcomings in the CPI as a Measure of the Cost of Living

The Consumer Price Index, like all economic statistics, is a flawed measure of the cost of living. That doesn't mean it's not useful, as long as we remember the flaws.

The CPI and Core Inflation Index

Imagine if you were driving a company truck across the country—you probably would care about things like the prices of available roadside food and motel rooms as well as the truck's operating condition. However, the manager of the firm might have different priorities. He or she would care mostly about the truck's on-time performance and much less so about the food you were eating and the places you were staying. In other words, the company manager would be paying attention to the production of the firm, while ignoring transitory elements that impacted you, but did not affect the company's bottom line.

In a sense, a similar situation occurs with regard to measures of inflation. As we've learned, CPI measures prices as they affect everyday household spending. Well, a **core inflation index** is typically calculated by taking the CPI and excluding volatile economic variables. In this way, economists have a better sense of the underlying trends in prices that affect the cost of living.

Examples of excluded variables include energy and food prices, which can jump around from month to month because of the weather. According to an article by Kent Bernhard, during Hurricane Katrina in 2005, a key supply point for the nation's gasoline was nearly knocked out. Gas prices quickly shot up across the nation, in some places up to 40 cents a gallon in one day. This was not the cause of an economic policy but rather a short-lived event until the pumps were restored in the region. In this case, the CPI that month would register the change as a cost of living event to households, but the core inflation index would remain unchanged. As a result, the Federal Reserve's decisions on interest rates would not be influenced. Similarly, droughts can cause world-wide spikes in food prices that, if temporary, do not affect the nation's economic capability.

As former Chairman of the Federal Reserve Ben Bernanke noted in 1999 about the core inflation index, "It provide(s) a better guide to monetary policy than the other indices, since it measures the more persistent underlying inflation rather than transitory influences on the price level." Bernanke also noted that it helps communicate that every inflationary shock need not be responded to by the Federal Reserve since some price changes are transitory and not part of a structural change in the economy.

In sum, both the CPI and the core inflation index are important, but serve different audiences. The CPI helps households understand their overall cost of living from month to month, while the core inflation index is a preferred gauge from which to make important government policy changes.

Substitution Bias

In recent years, the statisticians have paid considerable attention to a subtle problem: that the change in the total cost of buying a fixed basket of goods and services over time is conceptually not quite the same as the change in the **cost of living** because the cost of living represents how much it costs for a person to feel that his or her consumption provides an equal level of satisfaction or utility.

To understand the distinction, imagine that over the past 10 years, the cost of purchasing a fixed basket of goods increased by 25% and your salary also increased by 25%. Has your personal standard of living held constant? If you do not necessarily purchase an identical fixed basket of goods every year, then an inflation calculation based on the cost of a fixed basket of goods may be a misleading measure of how your cost of living has changed. Two problems arise here: substitution bias and quality/new goods bias.

When the price of a good rises, consumers tend to purchase less of it and to seek out substitutes instead. Conversely, as the price of a good falls, people will tend to purchase more of it. This pattern implies that goods with generally rising prices should tend over time to become less important in the overall basket of goods used to calculate inflation, while goods with falling prices should tend to become more important. Consider, as an example, a rise in the price of peaches by $100 per pound. If consumers were utterly

inflexible in their demand for peaches, this would lead to a big rise in the price of food for consumers. Alternatively, imagine that people are utterly indifferent to whether they have peaches or other types of fruit. Now, if peach prices rise, people completely switch to other fruit choices and the average price of food does not change at all. A fixed and unchanging basket of goods assumes that consumers are locked into buying exactly the same goods, regardless of price changes—not a very likely assumption. Thus, **substitution bias**—the rise in the price of a fixed basket of goods over time—tends to overstate the rise in a consumer's true cost of living, because it does not take into account that the person can substitute away from goods whose relative prices have risen. The flip side is that the CPI tends to understate consumers' **standard of living,** as measured by nominal income/CPI.

Quality Improvements

The other major problem in using a fixed basket of goods as the basis for calculating inflation is how to deal with the arrival of improved versions of older goods or altogether new goods. Consider the problem that arises if a cereal is improved by adding 12 essential vitamins and minerals—and also if a box of the cereal costs 5% more. It would clearly be misleading to count the entire resulting higher price as inflation, because the new price is being charged for a product of higher (or at least different) quality. Ideally, one would like to know how much of the higher price is due to the quality change, and how much of it is just a higher price. The Bureau of Labor Statistics, which is responsible for the computation of the Consumer Price Index, must deal with these difficulties in adjusting for quality changes.



Figure 1. This 1920 Ford Touring was $395. How do you think this price compares with today? And do you think the product is a different quality then as it is now?

A new product can be thought of as an extreme improvement in quality—from something that did not exist to something that does. However, the basket of goods that was fixed in the past obviously does not include new goods created since then. The basket of goods and services used in the Consumer Price Index (CPI) is revised and updated over time, and so new products are gradually included. But the process takes some time. For example, room air conditioners were widely sold in the early 1950s, but were not introduced into the basket of goods behind the Consumer Price Index until 1964. The VCR and personal computer were available in the late 1970s and widely sold by the early 1980s, but did not enter the CPI basket of goods until 1987. By 1996, there were more than 40 million cellular phone subscribers in the United States—but cell phones were not yet part of the CPI basket of goods. The parade of inventions has continued, with the CPI inevitably lagging a few years behind.

The arrival of new goods creates problems with respect to the accuracy of measuring inflation. The reason people buy new goods, presumably, is that the new goods offer better value for money than existing goods. Thus, if the price index leaves out new goods, it overlooks one of the ways in which the cost of living is improving. In addition, the price of a new good is often higher when it is first introduced and then declines over time. If the new good is not included in the CPI for some years, until its price is already lower, the CPI may miss counting this price decline altogether. Taking these arguments together, the **improved quality/new goods bias** means that the rise in the price of a fixed basket of goods over time tends to overstate the rise in a consumer's true cost of living, because it does not take into account how improvements in the quality of existing goods or the invention of new goods improves the standard of living.

Practical Solutions for the Substitution and the Improved Quality/New Goods Biases

By the early 2000s, the Bureau of Labor Statistics was using alternative mathematical methods for calculating the Consumer Price Index, more complicated than just adding up the cost of a fixed basket of goods, to allow for some substitution between goods. It was also updating the basket of goods behind the CPI more frequently, so that new and improved goods will be included more

rapidly. For certain products, the BLS was carrying out studies to try to measure the quality improvement. For example, with computers, an economic study can try to adjust for changes in speed, memory, screen size, and other characteristics of the product, and then calculate the change in price after these product changes are taken into account. But these adjustments are inevitably imperfect, and exactly how to make these adjustments is often a source of controversy among professional economists.

By the early 2000s, the substitution bias and quality/new goods bias had been somewhat reduced, so that since then the rise in the CPI probably overstates the true rise in inflation by only about 0.5% per year. Over one or a few years, this is not much; over a period of a decade or two, even half of a percent per year compounds to a more significant amount. In addition, the CPI tracks prices from physical locations, and not at online sites like Amazon, where prices can be lower.

When measuring inflation (and other economic statistics, too), a tradeoff arises between simplicity and interpretation. If the inflation rate is calculated with a basket of goods that is fixed and unchanging, then the calculation of an inflation rate is straightforward, but the problems of substitution bias and quality/new goods bias will arise. However, when the basket of goods is allowed to shift and evolve to reflect substitution toward lower relative prices, quality improvements, and new goods, the technical details of calculating the inflation rate grow more complex.

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glossary

[glossary-page][glossary-term]Core Inflation Index: [/glossary-term]
[glossary-definition]Version of the CPI excluding volatile economic components like energy and food prices[/glossary-definition]
[glossary-term]Improved Quality/New Goods Bias: [/glossary-term]
[glossary-definition]As the quality of goods improves over time, and as new goods become invented, the prices of those goods naturally increase reflecting their increased value; the result is that the CPI overstates the cost of living since some of the price increases it measures represent increases in value, not cost[/glossary-definition][glossary-term]Substitution Bias: [/glossary-term]
[glossary-definition]One one good or service becomes more expensive relative to others, consumers tend to substitute away from the more expensive item towards the cheaper item; this means that the weights used to calculate the CPI are no longer accurate, causing the CPI to overstate the cost of living[/glossary-definition][/glossary-page]
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7.24: The GDP Deflator and Other Major Price Indices

Learning Objectives

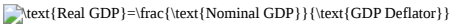
- Contrast the CPI with other price indices, including the PPI and GDP Deflator

Additional Price Indices: GDP Deflator, PPI, and More

We indicated earlier in this module that there are a number of important price indices, in addition to the CPI. These include the GDP Deflator, the Producer Price Index and the Employment Cost Index. Let's take a look at those now.

The GDP Deflator

We introduced the GDP Deflator in the last module as a critical part of our discussion of GDP and economic growth. The **GDP Deflator** is essentially the average price of all goods and services included in GDP. The GDP Deflator goes by several names, such as the Implicit Price Deflator for GDP, and the GDP Price Index, but they all mean the price index which is used to convert nominal into real GDP.



Nominal GDP is distorted by the effects of inflation, which "inflate" its value. Real GDP corrects for this distortion by removing the effects of inflation. As such, real GDP provides a more accurate measure of production economy-wide. Economic growth is typically measured by the percent change in real GDP. Neither of these measures is possible without the GDP deflator.

Since the GDP deflator incorporates the prices of everything included in GDP, the percentage change in the GDP Deflator is the broadest measure of inflation that exists, which is why it tends to be preferred by economists. Unlike the CPI, the baskets of goods and serviced used to compute the GDP deflator is not fixed, but re-calculates what each year's GDP would have been worth using the base-year's prices.

Calculating Real GDP using the GDP Deflator

As an example let's take a fictional production table for Switzerland that includes only three goods- cheese, watches and chocolate. Between the years 2009 and 2010 the output and prices of these goods produced by the Swiss economy changed, yet by calculating 2010 output in 2009 prices we can derive the Real GDP and therefore the GDP deflator.

Swiss Output in 2009:

Goods	*Quantity*	*Price (2009)*	*Total Value of Output*
Cheese	10	5	10 X 5 = 50
Watches	5	20	5 X 20 = 100
Chocolate	4	3	4 X 3 = 12
Nominal GDP:			50 + 100 + 12 *= 162*

From the table above the total value of output for each good in 2009 is derived by multiplying the quantity and price of those goods. Nominal GDP is simply the sum of these total values for cheese, chocolate, and watches.

Between 2009 and 2010 both the quantity produced and the prices of these goods increased. This results in a higher nominal GDP for 2010, yet only some of the increase can be attributed to increases in output or 'real' economic growth. A significant portion of this increase in nominal GDP is the result of pure price increases which do not make consumers any better off.

Swiss Output in 2010:

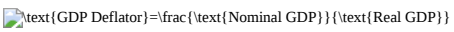
Goods	*Quantity*	*Price (2010)*	*Total Value of Output*
Cheese	12	5.5	12 X 5.5 = 66
Watches	6	22	6 X 22 = 132
Chocolate	5	3.5	5 X 3.5 = 17.5
Nominal GDP:			66 + 132 + 17.5 = *215.5*

We can better gauge the real economic growth from 2009-2010 by recalculating the 2010 quantities in 2009 prices. This makes 2009 our *base year* when calculating the 2010 GDP deflator. The 2010 GDP deflator is the index by which 2010 nominal GDP can be converted into 2010 real GDP in 2009 prices.

Swiss Output in 2010 (2009 prices):

Goods	*Quantity (2010)*	*Price (2009)*	*Total Value of Output*
Cheese	12	5	12 X 5 = 60
Watches	6	20	6 X 20 = 120
Chocolate	5	3	5 X 3 = 15
Real GDP (2009 prices):			60 + 120 + 15 = *195*

By now it should be apparent that we can adjust the formula for Real GDP above to calculate the GDP deflator. By multiplying both sides by the GDP deflator and then divide both sides by the Real GDP we get the following formula:



We know the nominal GDP in 2010 is 215.5 and the real GDP in 2009 prices is 195. By plugging in these values it is a simple exercise to calculate the GDP deflator for 2010 is equal to 1.11 (rounding to two decimal places). By dividing the 2010 nominal GDP by this value we get Switzerland's real GDP at 2009 price levels.

It is a simple exercise to apply this same method to subsequent years such as 2011, 2012, etc. By recalculating the value of goods and services produced in these years using 2009 prices we can derive a GDP deflator which can be used to quickly convert nominal GDP into real GDP. The GDP deflator is also a useful measure of inflation since the base year 2009.

Other Price Indices

The basket of goods behind the Consumer Price Index represents an average hypothetical U.S. household, which is to say that it does not exactly capture anyone's personal experience. When the task is to calculate an average level of inflation, this approach works fine. What if, however, you are concerned about inflation experienced by a certain group, like the elderly, or the poor, or

single-parent families with children, or Hispanic-Americans? In specific situations, a price index based on the buying power of the average consumer may not feel quite right.

To address problems like these, the BLS publishes a number of experimental price indices: some for particular groups like the elderly or the poor, some for different geographic areas, and some for certain broad categories of goods like food or housing.

The BLS also calculates several price indices that are not based on baskets of consumer goods. For example, the **Producer Price Index (PPI)** is based on prices paid for supplies and inputs by producers of goods and services. It can be broken down into price indices for different industries, commodities, and stages of processing (like finished goods, intermediate goods, crude materials for further processing, and so on). The PPI can be thought of as a measure of the (non-labor) costs of U.S. producers. Similarly, the **Employment Cost Index (ECI)** estimates the average cost of labor compensation to employers, including wages, salaries and fringe benefits. The percentage change in the ECI measures wage inflation in the labor market. There is an **International Price Index** based on the prices of merchandise that is exported or imported.

What's the best measure of inflation? If concerned with the most accurate measure of inflation, use the inflation rate measured with the GDP deflator as it picks up the prices of all goods and services produced. However, it is not a good measure of the cost of living as it includes prices of many products not purchased by households (for example, aircraft, fire engines, factory buildings, office complexes, and bulldozers). If one wants the most accurate measure of inflation as it impacts households, use the CPI, as it only picks up prices of products purchased by households. That is why the CPI is sometimes referred to as the cost-of-living index. As the Bureau of Labor Statistics states on its website: "The 'best' measure of inflation for a given application depends on the intended use of the data."

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glossary

[glossary-page][glossary-term]Employment Cost Index: [/glossary-term][glossary-definition]estimate of the average cost of labor compensation to employers, including wages, salaries and fringe benefits[/glossary-definition][glossary-term]GDP Deflator: [/glossary-term][glossary-definition] price index which measures the average price of all goods and services included in GDP; used to convert nominal into real GDP[/glossary-definition][glossary-term]Producer Price Index: [/glossary-term][glossary-definition]price index based on prices paid for supplies and inputs by producers of goods and services[/glossary-definition] [/glossary-page]

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7.25: Introduction to Price Instability

What you'll learn to do: identify the consequences of inflation



In this section, you will examine some of the various opinions about the necessity of and the consequences of inflation. Is all inflation bad, or is there such a thing as a healthy amount of inflation? Read on to learn about the consequences of inflation, both good and bad.

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7.26: Problems with Inflation

Learning Objectives

- Identify ways inflation can blur the perception of supply and demand
- Explain how inflation can cause redistributions of purchasing power

The Confusion Over Inflation

Economists usually oppose high inflation, but they oppose it in a milder way than many non-economists. Robert Shillller one of 2013's Nobel Prize winners in economics, carried out several surveys during the 1990s about attitudes toward inflation. One of his questions asked, "Do you agree that preventing high inflation is an important national priority, as important as preventing drug abuse or preventing deterioration in the quality of our schools?" Answers were on a scale of 1–5, where 1 meant "Fully agree" and 5 meant "Completely disagree." For the U.S. population as a whole, 52% answered "Fully agree" that preventing high inflation was a highly important national priority and just 4% said "Completely disagree." However, among professional economists, only 18% answered "Fully agree," while the same percentage of 18% answered "Completely disagree."

The Land of Funny Money

What are the economic problems caused by inflation, and why do economists often regard them with less concern than the general public? Consider a very short story: "*The Land of Funny Money.*"

One morning, everyone in the Land of Funny Money awakened to find that everything denominated in money had increased by 20%. The change was completely unexpected. Every price in every store was 20% higher. Paychecks were 20% higher. Interest rates were 20 % higher. The amount of money, everywhere from wallets to savings accounts, was 20% larger. This overnight inflation of prices made newspaper headlines everywhere in the Land of Funny Money. But the headlines quickly disappeared, as people realized that in terms of what they could actually buy with their incomes, this inflation had no economic impact. Everyone's pay could still buy exactly the same set of goods as it did before. Everyone's savings were still sufficient to buy exactly the same car, vacation, or retirement that they could have bought before. Equal levels of inflation in all wages and prices ended up not mattering much at all.

When the people in Robert Shiller's surveys explained their concern about inflation, one typical reason was that they feared that as prices rose, they would not be able to afford to buy as much. In other words, people were worried because they did not live in a place like the Land of Funny Money, where all prices and wages rose simultaneously. Instead, people live here on Planet Earth, where prices might rise while wages do not rise at all, or where wages rise more slowly than prices.

Economists note that over most periods, the inflation level in prices is roughly similar to the inflation level in wages, and so they reason that, on average, over time, people's economic status is not greatly changed by inflation. If all prices, wages, and interest rates adjusted automatically and immediately with inflation, as in the Land of Funny Money, then no one's purchasing power, profits, or real loan payments would change. However, if other economic variables do not move exactly in sync with inflation, or if they adjust for inflation only after a time lag, then inflation can cause three types of problems:

1. blurred price signals
2. unintended redistributions of purchasing power
3. difficulties in long-term planning

Blurred Price Signals

Prices are the messengers in a *market economy,* conveying information about conditions of demand and supply. Inflation blurs those price messages. Inflation means that price signals are perceived more vaguely, like a radio program received with a lot of static. If the static becomes severe, it is hard to tell what is happening.

In Israel, when inflation accelerated to an annual rate of 500% in 1985, some stores stopped posting prices directly on items, since they would have had to put new labels on the items or shelves every few days to reflect inflation. Instead, a shopper just took items from a shelf and went up to the checkout register to find out the price for that day. Obviously, this situation makes comparing prices and shopping for the best deal rather difficult. When the levels and changes of prices become uncertain, businesses and individuals find it harder to react to economic signals. In a world where inflation is at a high rate, but bouncing up and down to some extent, does a higher price of a good mean that inflation has risen, or that supply of that good has decreased, or that demand for that good has increased? Should a buyer of the good take the higher prices as an economic hint to start substituting other products—or have the prices of the substitutes risen by an equal amount? Should a seller of the good take a higher price as a reason to increase production—or is the higher price only a sign of a general inflation in which the prices of all inputs to production are rising as well? The true story will presumably become clear over time, but at a given moment, who can say?

High and variable inflation means that the incentives in the economy to adjust in response to changes in prices are weaker. Markets will adjust toward their equilibrium prices and quantities more erratically and slowly, and many individual markets will experience a greater chance of surpluses *a*nd shortages.

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Watch It

Another way of thinking about these blurred price signals is that inflation causes *price confusion* and *money illusion*. Typically, when prices of products rise, people can interpret the changing price with higher demand or greater scarcity, and adjust their purchasing behavior accordingly. When all prices are rising, people are less able to interpret signals from the changing price. Money illusion occurs when people mistake changes in nominal prices with changes in real (or relative) prices and might change their purchasing behavior even if there is no change in their purchasing power.

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Unintended Redistributions of Purchasing Power

Inflation can cause redistributions of purchasing power that hurt some and help others. People who are hurt by inflation include those who are holding a lot of cash, whether it is in a safe deposit box or in a cardboard box under the bed. When inflation happens, the buying power of cash is diminished. But cash is only an example of a more general problem: anyone who has financial assets invested in a way that the nominal return does not keep up with inflation will tend to suffer from inflation. For example, if a person has money in a bank account that pays 4% interest, but inflation rises to 5%, then the real rate of return for the money invested in that bank account is negative 1%.

The problem of a good-looking **nominal interest rate** being transformed into an ugly-looking **real interest rate** can be worsened by taxes. The U.S. income tax is charged on the nominal interest received in dollar terms, without an adjustment for inflation. So, a person who invests $10,000 and receives a 5% nominal rate of interest is taxed on the $500 received—no matter whether the inflation rate is 0%, 5%, or 10%. If inflation is 0%, then the real interest rate is 5% and all $500 is a gain in buying power. But if inflation is 5%, then the real interest rate is zero and the person had no real gain—but owes income tax on the nominal gain anyway. If inflation is 10%, then the real interest rate is *negative* 5% and the person is actually falling behind in buying power, but would still owe taxes on the $500 in nominal gains.

Inflation can cause unintended redistributions for wage earners, too. Wages do typically creep up with inflation over time eventually. The average hourly wage in the U.S. economy increased from $3.23 in 1970 to $19.20 in 2012, which is an increase by a factor of almost six. Over that time period, the Consumer Price Index increased by an almost identical amount. However, increases in wages may lag behind inflation for a year or two, since wage adjustments are often somewhat sticky and occur only once or twice a year. Moreover, the extent to which wages keep up with inflation creates insecurity for workers and may involve painful, prolonged conflicts between employers and employees. If the minimum wage is adjusted for inflation only infrequently, minimum wage workers are losing purchasing power from their nominal wages, as shown in Figure 1.

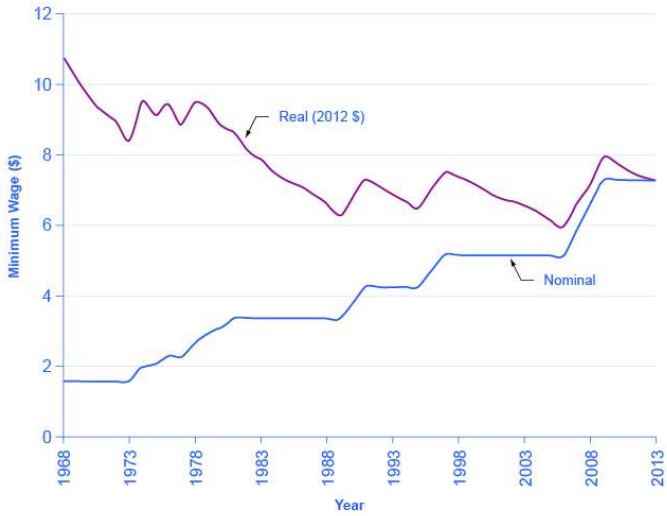


Figure 1.U.S. Minimum Wage and Inflation. After adjusting for inflation, the federal minimum wage dropped more than 30 percent from 1967 to 2010, even though the nominal figure climbed from $1.40 to $7.25 per hour. Increases in the minimum wage in between 2008 and 2010 kept the decline from being worse—as it would have been if the wage had remained the same as it did from 1997 through 2007. (Sources: http://www.dol.gov/whd/minwage/chart.htm; http://data.bls.gov/cgi-bin/surveymost?cu)

One sizable group of people has often received a large share of their income in a form that does not increase over time: retirees who receive a private company pension. Most **pensions** have traditionally been set as a fixed nominal dollar amount per year at retirement. For this reason, pensions are called “defined benefits” plans. Even if inflation is low, the combination of inflation and a fixed income can create a substantial problem over time. A person who retires on a fixed income at age 65 will find that losing just 1% to 2% of buying power per year to inflation compounds to a considerable loss of buying power after a decade or two.

Fortunately, pensions and other defined benefits retirement plans are increasingly rare, replaced instead by “defined contribution” plans, such as 401(k)s and 403(b)s. In these plans, the employer contributes a fixed amount to the worker’s retirement account on a regular basis (usually every pay check). The employer often contributes as well. The worker invests these funds in a wide range of investment vehicles. These plans are tax deferred, and they are portable so that if the individual takes a job with a different employer, their **401(k)** comes with them. To the extent that the investments made generate real rates of return, retirees do not suffer from the inflation costs of traditional pensioners.

However, ordinary people can sometimes benefit from the unintended redistributions of inflation. Consider someone who borrows $10,000 to buy a car at a fixed interest rate of 9%. If inflation is 3% at the time the loan is made, then the loan must be repaid at a real interest rate of 6%. But if inflation rises to 9%, then the real interest rate on the loan is zero. In this case, the borrower’s benefit from inflation is the lender’s loss. A borrower paying a fixed interest rate, who benefits from inflation, is just the flip side of an investor receiving a fixed interest rate, who suffers from inflation. The lesson is that when interest rates are fixed, rises in the rate of inflation tend to penalize suppliers of financial capital, who end up being repaid in dollars that are worth less because of inflation, while demanders of financial capital end up better off, because they can repay their loans in dollars that are worth less than originally expected.

Watch It

This video takes a closer look at the unintended redistributions of purchasing power by examining the ways that the interest impacts borrowers and lenders. You can think of the real interest rate as the nominal rate minus the inflation rate. If someone borrows money at a low interest rate, but the inflation rate goes up, the borrower benefits. Conversely, if someone borrows money at a high interest rate but the inflation rate drops, the lenders benefit.

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The unintended redistributions of buying power caused by inflation may have a broader effect on society. America’s widespread acceptance of market forces rests on a perception that people’s actions have a reasonable connection to market outcomes. When inflation causes a retiree who built up a pension or invested at a fixed interest rate to suffer, however, while someone who borrowed at a fixed interest rate benefits from inflation, it is hard to believe that this outcome was deserved in any way. Similarly, when homeowners benefit from inflation because the price of their homes rises, while renters suffer because they are paying higher rent, it is hard to see any useful incentive effects. One of the reasons that inflation is so disliked by the general public is a sense that it makes economic rewards and penalties more arbitrary—and therefore likely to be perceived as unfair—even dangerous, as the next example shows.

Is there a connection between German hyperinflation and Hitler’s rise to power?

Germany suffered an intense hyperinflation of its currency, the Mark, in the years after World War I, when the Weimar Republic in Germany resorted to printing money to pay its bills and the onset of the Great Depression created the social turmoil that Adolf Hitler could take advantage of in his rise to power. Shiller described the connection this way in a National Bureau of Economic Research 1996 Working Paper:

A fact that is probably little known to young people today, even in Germany, is that the final collapse of the Mark in 1923, the time when the Mark’s inflation reached astronomical levels (inflation of 35,974.9% in November 1923 alone, for an annual rate that month of 4.69×10^{28}%), came in the same month as did Hitler’s Beer Hall Putsch, his Nazi Party’s armed attempt to overthrow the German government. This failed putsch resulted in Hitler’s imprisonment, at which time he wrote his book *Mein Kampf*, setting forth an inspirational plan for Germany’s future, suggesting plans for world domination. . .
. . . Most people in Germany today probably do not clearly remember these events; this lack of attention to it may be because its memory is blurred by the more dramatic events that succeeded it (the Nazi seizure of power and World War II). However, to someone living through these historical events in sequence . . . [the putsch] may have been remembered as vivid evidence of the potential effects of inflation.

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Problems of Long-Term Planning

Inflation can make long-term planning difficult. In discussing unintended redistributions we considered the case of someone trying to plan for retirement with a pension that is fixed in nominal terms and a high rate of inflation. Similar problems arise for all people trying to save for retirement, because they must consider what their money will really buy several decades in the future when the rate of future inflation cannot be known with certainty.

Inflation, especially at moderate or high levels, will pose substantial planning problems for businesses, too. A firm can make money from inflation—for example, by paying bills and wages as late as possible so that it can pay in inflated dollars, while collecting revenues as soon as possible. A firm can also suffer losses from inflation, as in the case of a retail business that gets stuck holding too much cash, only to see the value of that cash eroded by inflation. But when a business spends its time focusing on how to profit by inflation, or at least how to avoid suffering from it, an inevitable tradeoff strikes: less time is spent on improving products and services or on figuring out how to make existing products and services more cheaply. An economy with high inflation rewards businesses that have found clever ways of profiting from inflation, which are not necessarily the businesses that excel at productivity, innovation, or quality of service.

In the short term, low or moderate levels of inflation may not pose an overwhelming difficulty for business planning, because costs of doing business and sales revenues may rise at similar rates. If, however, inflation varies substantially over the short or medium term, then it may make sense for businesses to stick to shorter-term strategies. The evidence as to whether relatively low rates of inflation reduce productivity is controversial among economists. There is some evidence that if inflation can be held to moderate levels of less than 3% per year, it need not prevent a nation's real economy from growing at a healthy pace. For some countries that have experienced hyperinflation of several thousand percent per year, an annual inflation rate of 20–30% may feel basically the same as zero. However, several economists have pointed to the suggestive fact that when U.S. inflation heated up in the early 1970s—to 10%—U.S. growth in productivity slowed down, and when inflation slowed down in the 1980s, productivity edged up again not long thereafter, as shown in Figure 2.

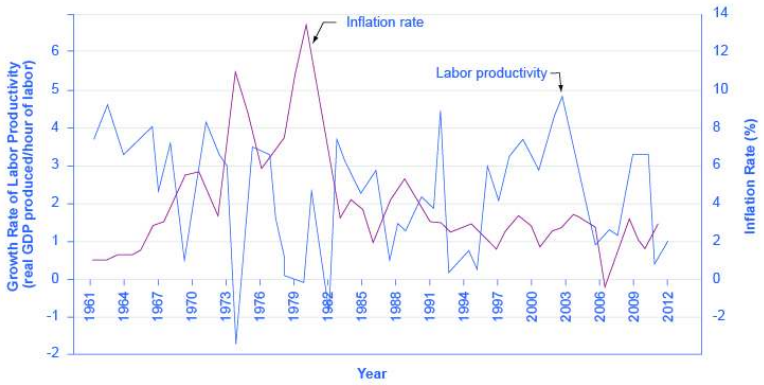


Figure 2. U.S. Inflation Rate and U.S. Labor Productivity, 1961–2012. Over the last several decades in the United States, there have been times when rising inflation rates have been closely followed by lower productivity rates and lower inflation rates have corresponded to increasing productivity rates. As the graph shows, however, this correlation does not always exist.

Glossary

[glossary-page][glossary-term]401(k): [/glossary-term]
[glossary-definition]a defined contribution retirement program to which the employee and often the employer contribute[/glossary-definition]
[glossary-term]nominal interest rate: [/glossary-term][glossary-definition]the actual interest rate charged on a loan[/glossary-definition][glossary-term]pension: [/glossary-term][glossary-definition]a defined benefit retirement payment[/glossary-definition][glossary-term]real interest rate: [/glossary-term][glossary-definition]the interest rate after inflation is taken into account; the nominal interest rate minus the rate of inflation[/glossary-definition][/glossary-page]

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CHAPTER OVERVIEW

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8.1: Why It Matters- The Aggregate Demand-Aggregate Supply Model

Why utilize the aggregate demand-aggregate supply model to analyze the economy?



This may be the most important module in the principles of macroeconomics course. The module introduces the key macroeconomic model, the aggregate demand-aggregate supply model, that will be used in nearly every module that follows. Studying this module will be like learning how to cut and join wood for a carpenter, learning how to work with pipes for a plumber, or learning how to write code for a programmer. In short, this is what macroeconomics is all about: using a model model, like AD-AS, to analyze issues and problems in the macro economy. The effort you put into learning this module will be time well spent.

The AD-AS model shows how spending in the economy (AD) interacts with production (AS) to determine the aggregate price level and the level of real GDP. The model works like an ordinary market demand and supply model, but you will see that the way it is interpreted is quite different.

Some of the questions you will explore are:

- What does the macro economy look like in the short run?
- What does it look like over the long run?
- What determines the amount of total spending in the economy?
- What determines the amount of real GDP?
- How do the level of GDP and the price level respond to shocks (i.e., changes) in aggregate demand or aggregate supply?
- How do these answers differ in the short run versus the long run?

Let's get started.

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8.2: Introduction to the Aggregate Demand-Aggregate Supply Model

What you'll learn to do: use the AD-AS model to explain the equilibrium levels of real GDP and price level



In this section, you will learn the concepts of aggregate demand and aggregate supply, and how they can be combined in the AD-AS model to identify equilibrium in the macro economy. You will also be able to analyze how shocks to either aggregate demand or aggregate supply affect real GDP and the aggregate price level as the economy moves to a new macro equilibrium.

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8.3: The Aggregate Demand-Aggregate Supply Model

Learning Objectives

- Simply describe the aggregate supply-aggregate demand model

Introduction to the Aggregate Demand-Aggregate Supply Model

The economic history of the United States is cyclical in nature with recessions and expansions. Some of these fluctuations are severe, such as the economic downturn experienced during Great Depression of the 1930's which lasted for a decade. Why does the economy grow at different rates in different years? What are the causes of the cyclical behavior of the economy?

A key part of macroeconomics is the use of models to analyze macro issues and problems. How is the rate of economic growth connected to changes in the unemployment rate? Is there a reason why unemployment and inflation seem to move in opposite directions: lower unemployment and higher inflation from 1997 to 2000, higher unemployment and lower inflation in the early 2000s, lower unemployment and higher inflation in the mid-2000s, and then higher unemployment and lower inflation in 2009? Why did the current account deficit rise so high, but then decline in 2009?

To analyze questions like these, we must move beyond discussing macroeconomic issues one at a time, and begin building economic models that will capture the relationships and interconnections between them. This module introduces the macroeconomic model of **aggregate demand and aggregate supply**, how the two interact to reach a macroeconomic equilibrium, and how shifts in aggregate demand or aggregate supply will affect that equilibrium. This section also relates the model of aggregate demand and aggregate supply to the three goals of economic policy (economic growth, stable prices (low inflation), and full employment), and provides a framework for thinking about many of the connections and tradeoffs between these goals. This model will aid us in understanding why economies expand and contract over time.

A simple version of the AD-AS graph is shown in Figure 1. The horizontal x-axis shows the real output, or GDP of the macroeconomy. The vertical y-axis shows the price level.

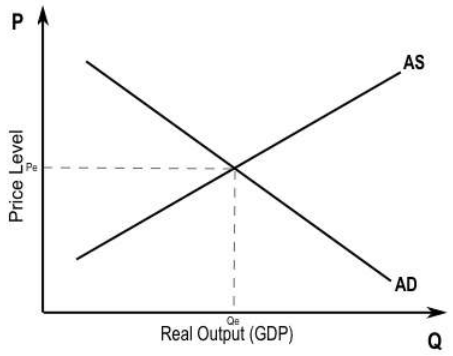


Figure 1. Aggregate Demand-Aggregate Supply Model, showing equilibrium at Pe & Qe.

Watch It

This video provides a nice overview of the key concepts surrounding the aggregate demand-aggregate supply model that we will cover in the next few sections. Watch it carefully so that you have a context for the explanations, diagrams and examples that follow.

A link to an interactive elements can be found at the bottom of this page.

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FROM HOUSING BUBBLE TO HOUSING BUST

The United States experienced rising home ownership rates for most of the last two decades. Between 1990 and 2006, the U.S. housing market grew. Homeownership rates grew from 64% to a high of over 69% between 2004 and 2005. For many people, this was a period in which they could either buy first homes or buy a larger and more expensive home. During this time mortgage values tripled. Housing became more accessible to Americans and was considered to be a safe financial investment. Figure 2 shows how new single family home sales peaked in 2005 at 107,000 units.

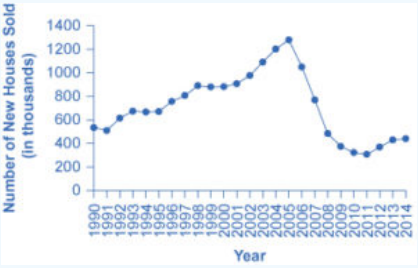


Figure 2. New Single Family Houses Sold. From the early 1990s up through 2005, the number of new single family houses sold rose steadily. In 2006, the number dropped dramatically and this dramatic decline continued through 2011. In 2012, the number sold rose a bit over previous years, but it was still lower than the number of new houses sold in 1990. (Source: U.S. Census Bureau)

The housing bubble began to show signs of bursting in 2005, as delinquency and late payments began to grow and an oversupply of new homes on the market became apparent. Dropping home values contributed to a decrease in the overall wealth of the household sector and caused homeowners to pull back on spending. Several mortgage lenders were forced to file for bankruptcy because homeowners were not making their payments, and by 2008 the problem had spread throughout the financial markets. Lenders clamped down on credit and the housing bubble burst. Financial markets were now in crisis and unable or unwilling to even extend credit to credit-worthy customers.



Figure 3. At the peak of the housing bubble, many people across the country were able to secure the loans necessary to build new houses. (Credit: modification of work by Tim Pierce/Flickr Creative Commons)

The housing bubble and the crisis in the financial markets were major contributors to the Great Recession that led to unemployment rates over 10% and falling GDP. We can show this using AD-AS, but first we need to learn more about the model. While the United States is still recovering from the impact of the Great Recession, it has made substantial progress in restoring financial market stability through the implementation of aggressive fiscal and monetary policy.

Learning Objectives

[glossary-page][glossary-term]aggregate demand/aggregate supply model: [/glossary-term][glossary-definition]a model that shows what determines real GDP and the aggregate price level through the interaction between total spending on domestic goods and services (i.e aggregate demand) and total production by businesses (i.e. aggregate supply)[/glossary-definition] [/glossary-page]

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8.4: Building a Model of Aggregate Supply and Aggregate Demand

Learning Objectives

- Define and explain the aggregate supply curve and the economic behavior behind it
- Compare and contrast the short run and long run aggregate supply curves
- Define and explain the aggregate demand curve and the economic behavior behind it
- Differentiate between the two concepts of aggregate demand and aggregate supply

Aggregate Supply

The Aggregate Demand-Aggregate Supply model is designed to answer the questions of what determines the level of economic activity in the economy (i.e. what determines real GDP and employment), and what causes economic activity to speed up or slow down.

We can begin to answer these questions if we think about the concept of the aggregate production function, which we introduced in the context of economic growth. The aggregate production function shows the relationship between the resources (or factors of production) the economy has (e.g. labor, capital, technology, etc.) and the amount of output (i.e. real GDP) that can be produced. If all resources are fully employed, the resulting output is called Potential GDP. (Over time, as the economy obtains more resources as the labor force and capital stock grow and as technology improves, the economy produces more GDP. We have described this process as economic growth.)

Firms make decisions about what quantity of output to supply based on the profits they expect to earn. Profits, in turn, are also determined by the price of the outputs the firm sells and by the price of the inputs, like labor or raw materials, the firm needs to buy.

The previous paragraph included a critical assumption: full employment of resources. Why wouldn't all resources be fully employed? Recall that when we discussed cyclical unemployment, we pointed out that wages are often sticky, that is, they don't respond immediately to changes in demand for labor. The same thing may be true of other input prices. Let's think about that in the context of an aggregate supply curve, showing the relationship between the aggregate price level and real GDP.

Aggregate supply (AS) refers to the total quantity of output (i.e. real GDP) firms will produce. The **aggregate supply (AS) curve** shows the total quantity of output firms will produce and sell (i.e, real GDP) at each aggregate price level, holding the price of inputs fixed.

Recall that the aggregate price level is an average of the prices of outputs in the economy. A decrease in the price level means that firms would like to reduce the wage rate they pay so they can maintain their profits. If wages are sticky downwards, labor becomes too expensive to keep fully employed, so firms layoff workers. (Economists would say that the real wage (W/P) is too high.) With fewer workers employed, firms produce less output and real GDP decreases. In short, when wages are sticky in response to changes in demand, then a lower aggregate price level corresponds to a lower level of real GDP. Similarly, an increase in the price level means that firms would like to raise wages, but it wages are sticky, labor becomes cheap so firms increase employment (or work hours) and real GDP increases.

Figure 1 shows an aggregate supply curve. In the following paragraphs, we will walk through the elements of the diagram one at a time: the horizontal and vertical axes, the aggregate supply curve itself, and the meaning of the potential GDP vertical line.

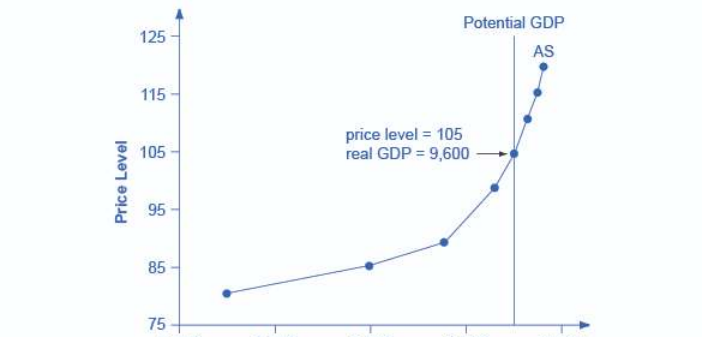


Figure 1. The Aggregate Supply Curve. Aggregate supply (AS) slopes up, because as the price level for outputs rises, with the price of inputs remaining fixed, firms have an incentive to produce more and to earn higher profits. The potential GDP line shows the maximum that the economy can produce with full employment of workers and physical capital.

The horizontal axis of the diagram shows real GDP—that is, the level of GDP adjusted for inflation. The vertical axis shows the aggregate price level. As the price level rises, the aggregate quantity of goods and services produced rises as well. Why? The price level shown on the vertical axis represents the average price for final goods or outputs purchased in the economy, i.e. the GDP deflator. It is not the price level for intermediate goods and services that are inputs to production. Thus, the AS curve describes how suppliers will react to a higher price level for outputs of goods and services, while holding the prices of inputs like labor and energy constant. If firms across the economy face a situation where the price level of what they produce and sell is rising, but their costs of production are not rising, then the lure of higher profits will induce them to expand production.

The slope of an AS curve changes from nearly flat at its far left to nearly vertical at its far right. At the far left of the aggregate supply curve, the level of output in the economy is far below **potential GDP,** which is defined as the quantity that an economy can produce by fully employing its resources of labor, physical capital, and technology, in the context of its existing market and legal institutions. At these relatively low levels of output, levels of unemployment are high, and many factories are running only part-time, or have closed their doors. In this situation, a relatively small increase in the prices of the outputs that businesses sell—while making the assumption of no rise in input prices—can encourage a considerable surge in real GDP because so many workers and factories are ready to swing into production.

As the quantity produced increases, however, certain firms and industries will start running into limits: perhaps nearly all of the expert workers in a certain industry will have jobs or factories in certain geographic areas or industries will be running at full speed. In the intermediate area of the AS curve, a higher price level for outputs continues to encourage a greater quantity of output—but as the increasingly steep upward slope of the aggregate supply curve shows, the increase in GDP in response to a given rise in the price level will not be quite as large.

WHY DOES AS CROSS POTENTIAL GDP?

The aggregate supply curve is typically drawn to cross the potential GDP line. This shape may seem puzzling: How can an economy produce at an output level which is higher than its "potential" or "full employment" GDP? The economic intuition here is that if prices for outputs were high enough, producers would make fanatical efforts to produce: all workers would be on double-overtime, all machines would run 24 hours a day, seven days a week. Such hyper-intense production would go beyond using potential labor and physical capital resources fully, to using them in a way that is not sustainable in the long term. Thus, it is indeed possible for production to sprint above potential GDP, but only in the short run.

At the far right, the aggregate supply curve becomes nearly vertical. At this quantity, higher prices for outputs cannot encourage additional output, because even if firms want to expand output, the inputs of labor and machinery in the economy are fully employed. In this example, the vertical line in the exhibit shows that potential GDP occurs at a total output of 9,500. When an economy is operating at its potential GDP, machines and factories are running at capacity, and the unemployment rate is relatively low—at the natural rate of unemployment. For this reason, potential GDP is sometimes also called **full-employment GDP**.

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Defining SRAS and LRAS

If we define the short run as the period of time that wages are sticky, then we can describe the positive relationship between P & Q as the **short run aggregate supply (SRAS) curve**, shown above in Figure 1 as AS.

In the long run, however, all wages and prices are fully flexible. As a consequence, all resources will be fully employed and real GDP will equal potential, regardless of the price level. Thus, in the long run, real GDP will be independent of the price level, and the **long run aggregate supply (LRAS)curve** will be a vertical line at potential (or the full employment level of) GDP. This can be seen on a graph as potential GDP (as in Figure 1) or as LRAS.

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The Aggregate Demand Curve

Aggregate demand (AD)refers to total spending in an economy on domestic goods and services. (Strictly speaking, AD is what economists call total planned expenditure. You'll learn about this in more detail in the Keynesian module.) It includes all four components of spending: consumption expenditure, investment expenditure, government expenditure, and net export expenditure (exports minus imports). This demand is determined by a number of factors, but one of them is the aggregate price level. The **aggregate demand (AD) curve** shows the total spending on domestic goods and services at each price level.

Figure 2 presents an aggregate demand (AD) curve. Just like the aggregate supply curve, the horizontal axis shows real GDP and the vertical axis shows the price level. The AD curve is downward sloping from left to right, which means that a decrease in the aggregate price level leads to an increase in the amount of total spending on domestic goods and services. Even though the AD curve *looks* like a microeconomic demand curve, it doesn't operate the same way. Rather, the reasons behind this negative relationship are related to how changes in the price level affect the different components of aggregate demand. Recall that aggregate demand consists of consumption spending (C), investment spending (I), government spending (G), and spending on exports (X) minus imports (M): C + I + G + X – M.

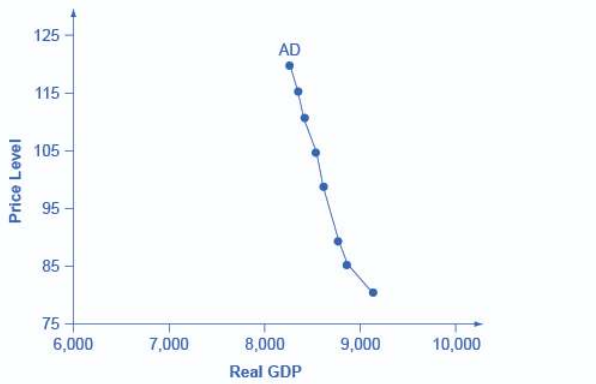


Figure 2. The Aggregate Demand Curve. Aggregate demand (AD) slopes down, showing that, as the price level rises, the amount of total spending on domestic goods and services declines.

There are three specific reasons for why AD curves are downward sloping. These are the wealth effect, the interest rate effect and the foreign price effect. Each of them tends to affect a different component of aggregate demand.

The **wealth effect** holds that as the price level increases, the buying power of savings that people have stored up in bank accounts and other assets will diminish, eaten away to some extent by inflation. Because a rise in the price level reduces people's wealth, consumption spending will fall as the price level rises.

The **interest rate effect** is that as prices for outputs rise, the same purchases will take more money or credit to accomplish. This additional demand for money and credit will push interest rates higher. In turn, higher interest rates will reduce borrowing by businesses for investment purposes and reduce borrowing by households for homes and cars—thus reducing consumption and investment spending.

The **foreign price effect** points out that if prices rise in the United States while remaining fixed in other countries, then goods in the United States will be relatively more expensive compared to goods in the rest of the world. U.S. *exports* will be relatively more expensive, and the quantity of exports sold will fall. U.S. *imports* from abroad will be relatively cheaper, so the quantity of imports will rise. Thus, a higher domestic price level, relative to price levels in other countries, will reduce net export expenditures.

Truth be told, among economists all three of these effects are controversial, in part because they do not seem to be very large. For this reason, the aggregate demand curve in Figure 2 slopes downward fairly steeply; the steep slope indicates that a higher price level for final outputs reduces aggregate demand for all three of these reasons, but that the change in the quantity of aggregate demand as a result of changes in price level is not very large.

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Learning Objectives

[glossary-page][glossary-term]aggregate demand (AD): [/glossary-term][glossary-definition]the amount of total spending on domestic goods and services in an economy[/glossary-definition][glossary-term]aggregate supply (AS): [/glossary-term][glossary-definition]the total quantity of output (i.e. real GDP) firms will produce and sell[/glossary-definition][glossary-term]aggregate demand (AD) curve: [/glossary-term][glossary-definition]the total spending on domestic goods and services at each aggregate price level[/glossary-definition][glossary-term]aggregate supply (AS) curve: [/glossary-term][glossary-definition]the total quantity of output (i.e. real GDP) that firms will produce and sell at each aggregate price level[/glossary-definition][glossary-term]aggregate demand/aggregate supply model: [/glossary-term][glossary-definition]a model that shows the equilibrium real GDP & aggregate price level for the macro economy, based on the interaction between aggregate demand and aggregate supply[/glossary-definition][glossary-term]foreign price effect: [/glossary-term][glossary-definition]if prices rise in the United States while remaining fixed in other countries, then goods in the United States will be relatively more expensive compared to goods in the rest of the world[/glossary-definition][glossary-term]interest rate effect:[/glossary-term][glossary-definition] as the aggregate price level rises, the same purchases will take more money or credit to accomplish, driving up interest rates[/glossary-definition][glossary-term]long run: [/glossary-term][glossary-definition]period of time during which all wages and prices are fully flexible[/glossary-definition][glossary-term]long run aggregate supply (LRAS) curve: [/glossary-term][glossary-definition]vertical line at potential GDP showing no relationship between the aggregate price level and real GDP in the long run[/glossary-definition][glossary-term]potential GDP: [/glossary-term][glossary-definition]the maximum quantity that an economy can produce given full employment of its existing levels of labor, physical capital, technology, and institutions; also known as full employment GDP[/glossary-definition][glossary-term]short run: [/glossary-term][glossary-definition]period of time during which wages (and some prices) are sticky in response to a change in demand[/glossary-definition][glossary-term]short run aggregate supply (SRAS) curve: [/glossary-term][glossary-definition]positive short run relationship between the aggregate price level and real GDP, holding the prices of inputs fixed [/glossary-definition][glossary-term]wealth effect: [/glossary-term][glossary-definition]as price level increases, the buying power of savings that people have stored up in bank accounts and other assets will diminish[/glossary-definition][/glossary-page]

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8.5: Interpreting the AD-AS Model

Learning Objectives

- Use the aggregate demand-aggregate supply model to identify the equilibrium level of real GDP and equilibrium price level
- Interpret and draw conclusions about the macro economy using the aggregate demand-aggregate supply model

Equilibrium in the Aggregate Demand–Aggregate Supply Model

Figure 1 combines the AS curve and the AD curve from Figures 1 & 2 on the previous page and places them both on a single diagram. The intersection of the aggregate supply and aggregate demand curves shows the equilibrium level of real GDP and the equilibrium price level in the economy. In this example, the equilibrium point occurs at point E, at a price level of 90 and an output level of 8,800.

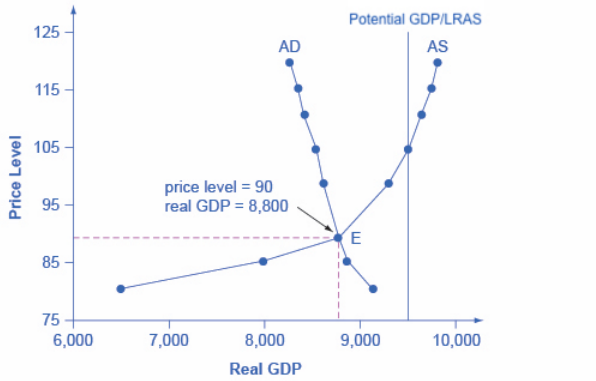


Figure 1. Aggregate Supply and Aggregate Demand. The equilibrium, where aggregate supply (AS) equals aggregate demand (AD), occurs at a price level of 90 and an output level of 8,800.

Examining the AS-AD MOdel

Table 1 shows information on aggregate supply, aggregate demand, and the price level for the imaginary country of Xurbia. What information does Table 1 tell you about the state of the Xurbia's economy? Where is the equilibrium price level and output level (this is the SR macroequilibrium)? Is Xurbia risking inflationary pressures or facing high unemployment? How can you tell?

Table 1. Price Level:Aggregate Supply–Aggregate Demand

Price Level	Aggregate Demand	Aggregate Supply
110	$700	$600
120	$690	$640
130	$680	$680
140	$670	$720
150	$660	$740
160	$650	$760
170	$640	$770

To begin to use the AS–AD model, it is important to plot the AS and AD curves from the data provided. What is the equilibrium?

Step 1. Draw your x- and y-axis. Label the x-axis "Real GDP" and the y-axis "Price Level."

Step 2. Plot AD on your graph.

Step 3. Plot AS on your graph.

Step 4. Look at Figure 2, which provides a visual to aid in your analysis.

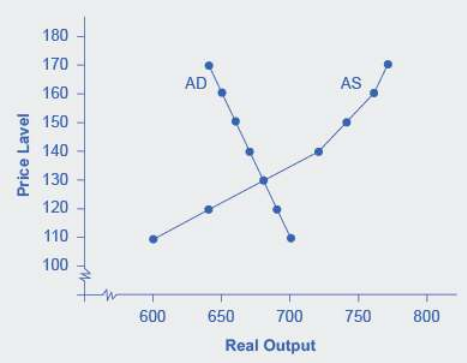


Figure 2. The AS–AD Curves AD and AS curves created from the data in Table 1.

Step 5. Determine where AD and AS intersect. This is the equilibrium with the price level at 130 and real GDP at $680.

Step 6. Look at the graph to determine where equilibrium is located. We can see that this equilibrium is fairly far from where the AS curve becomes near-vertical (or at least quite steep) which seems to start at about $750 of real output. This implies that the economy is not close to potential GDP. Thus, unemployment will be high. In the relatively flat part of the AS curve, where the equilibrium occurs, changes in the price level will not be a major concern, since such changes are likely to be small.

Step 7. Determine what the steep portion of the AS curve indicates. Where the AS curve is steep, the economy is at or close to potential GDP.

Step 8. Draw conclusions from the given information:

- If equilibrium occurs in the flat range of AS, then economy is not close to potential GDP and will be experiencing unemployment, but stable price level.
- If equilibrium occurs in the steep range of AS, then the economy is close or at potential GDP and will be experiencing rising price levels or inflationary pressures, but will have a low unemployment rate.

Try It

https://assessments.lumenlearning.co...sessments/7517

https://assessments.lumenlearning.co...sessments/7518

Confusion sometimes arises between the aggregate supply and aggregate demand model and the microeconomic analysis of demand and supply in particular markets for goods, services, labor, and capital.

ARE AS AND AD MACRO OR MICRO?

These aggregate supply and aggregate demand model and the microeconomic analysis of demand and supply in particular markets for goods, services, labor, and capital have a superficial resemblance, but they also have many underlying differences.

For example, the vertical and horizontal axes have distinctly different meanings in macroeconomic and microeconomic diagrams. The vertical axis of a microeconomic demand and supply diagram expresses a price (or wage or rate of return) for an individual good or service. This price is implicitly relative: it is intended to be compared with the prices of other products (for example, the price of pizza relative to the price of fried chicken). In contrast, the vertical axis of an aggregate supply and aggregate demand diagram expresses the level of a price index like the Consumer Price Index or the GDP deflator—combining a wide array of prices from across the economy. The price level is absolute: it is not intended to be compared to any other prices since it is essentially the average price of all products in an economy. The horizontal axis of a microeconomic supply and demand curve measures the quantity of a particular good or service. In contrast, the horizontal axis of the aggregate demand and aggregate supply diagram measures real GDP, which is the sum of all the final goods and services produced in the economy, not the quantity in a specific market.

In addition, the economic reasons for the shapes of the curves in the macroeconomic model are different from the reasons behind the shapes of the curves in microeconomic models. Demand curves for individual goods or services slope down primarily because of the existence of substitute goods, not the wealth effects, interest rate, and foreign price effects associated with aggregate demand curves. The slopes of individual supply and demand curves can have a variety of different slopes, depending on the extent to which quantity demanded and quantity supplied react to price in that specific market, but the slopes of the AS and AD curves are much the same in every diagram (although as we shall see in later chapters, short-run and long-run perspectives will emphasize different parts of the AS curve).

In short, just because the AS–AD diagram has two lines that cross, do not assume that it is the same as every other diagram where two lines cross. The intuitions and meanings of the macro and micro diagrams are only distant cousins from different branches of the economics family tree.

Try It

These questions allow you to get as much practice as you need, as you can click the link at the top of the first question ("Try another version of these questions") to get a new set of questions. Practice until you feel comfortable doing the questions.

[ohm_question sameseed=1]152135-152137-152138[/ohm_question]

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8.6: Introduction to Shifts in Aggregate Supply and Demand

What you'll learn to do: examine factors that shift aggregate supply and aggregate demand



In this section, you'll learn about the macroeconomic factors that cause shifts in the aggregate supply and aggregate demand model. The readings introduce what causes shifts in the AD curve, particularly changes in the behavior of consumers or firms and changes in government tax or spending policy. We'll also discuss two of the most important factors that can lead to shifts in the AS curve: productivity growth and changes in input prices.

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8.7: Shifts in Aggregate Demand

Learning Objectives

- Describe the causes and implications of shifts in aggregate demand

Shifts in Aggregate Demand

Demand shocks are events that shift the aggregate demand curve. We defined the AD curve as showing the amount of total planned expenditure on domestic goods and services at any aggregate price level. As mentioned previously, the components of aggregate demand are consumption spending (C), investment spending (I), government spending (G), and spending on exports (X) minus imports (M). A shift of the AD curve to the right means that at least one of these components increased so that a greater amount of total spending would occur at every price level. This is called a **positive demand shock.** A shift of the AD curve to the left means that at least one of these components decreased so that a lesser amount of total spending would occur at every price level. This is called a **negative demand shock.** The next module on the Keynesian Perspective will discuss the components of aggregate demand and the factors that affect them in more detail. Here, the discussion will sketch two broad categories that could cause AD curves to shift: changes in the behavior of consumers or firms and changes in government tax or spending policy.

Try It

We have seen that the formula for aggregate demand is AD = C + I + G + X – M, where M is the total value of exported goods. Why is there a minus sign in front of imports? Does this mean that more imports will result in a lower level of aggregate demand?

Actually, imports are already included in the formula in the form of consumption (C) or investment (I). When an American consumer or business buys a foreign product, it gets counted along with all other consumption and investment. Since the income generated does not go to American producers, but rather to producers in another country, it would be wrong to count this as part of domestic demand. Therefore, imports added in consumption or investment are subtracted back out in the M term of the equation.

Because of the way in which the demand equation is written, it is easy to make the mistake of thinking that imports are bad for the economy. Just keep in mind that every negative number in the M term has a corresponding positive number in the C or I terms, and they always cancel out.

How Changes by Consumers and Firms Can Affect AD

When consumers feel more confident about the future of the economy, they tend to consume more. If **business confidence** is high, then firms tend to spend more on investment, believing that the future payoff from that investment will be substantial. Conversely, if consumer or business confidence drops, then consumption and investment spending decline.

The ConferenceBoard, a business-funded research organization, carries out national surveys of consumers and executives to gauge their degree of optimism about the near-term future economy. The Conference Board asks a number of questions about how consumers and business executives perceive the economy and then combines the answers into an overall measure of confidence, rather like creating an index number to represent the price level from a variety of individual prices. For **consumer confidence**, the overall level of confidence in 1985 is used as a base year and set equal to 100, and confidence in every other year can be compared to that base year. Measured on this scale, for example, consumer confidence rose from 100 in August 2006 to 111 in February 2007, but had plummeted to 56 by early 2010. As of October 2017, the index had a value of 125.9.

The University of Michigan publishes a survey of consumer confidence and constructs an index of consumer confidence each month. The survey results are then reported at http://www.sca.isr.umich.edu, which break down the change in consumer confidence among different income levels. According to that index, consumer confidence averaged around 90 prior to the Great Recession, and then it fell to below 60 in late 2008, which was the lowest it had been since 1980. Since then, confidence has climbed from a 2011 low of 55.8 back to a level of 98.5 in October 2017 which is considered healthy.

The OECD, an group consisting of the major developed countries, publishes the **Business Confidence** Index. After sharply declining during the Great Recession, the measure has risen above 100 again and is back to long-term averages. Of course, none of these survey measures are very precise. They can however, suggest when confidence is rising or falling, as well as when it is relatively high or low compared to the past.

Because a rise in confidence is associated with higher consumption and investment demand, it will lead to an outward shift in the AD curve, and a move of the equilibrium, from E_0 to E_1, to a higher quantity of output and a higher price level, as you can see in the following interactive graph (Figure 1):

A link to an interactive elements can be found at the bottom of this page.

Figure 1 (Interactive Graph). Shifts in Aggregate Demand.

Consumer and business confidence often reflect macroeconomic realities; for example, confidence is usually high when the economy is growing briskly and low during a recession. However, economic confidence can sometimes rise or fall for reasons that do not have a close connection to the immediate economy, like a risk of war, election results, foreign policy events, or a pessimistic prediction about the future by a prominent public figure. U.S. presidents, for example, must be careful in their public pronouncements about the economy. If they offer economic pessimism, they risk provoking a decline in confidence that reduces consumption and investment and shifts AD to the left, and in a self-fulfilling prophecy, contributes to causing the recession that the president warned against in the first place. A shift of AD to the left, and the corresponding movement of the equilibrium, from E_0 to E_1, to a lower quantity of output and a lower price level, can be seen in the following interactive graph (Figure 2):

An interactive or media element has been excluded from this version of the text. You can view it online here: http://pb.libretexts.org/mlum/?p=363

Figure 2 (Interactive Graph). Shifts in Aggregate Demand.

How Government Macroeconomic Policy Choices Can Shift AD

Government spending is one component of AD. Thus, higher government spending will cause AD to shift to the right, as in Figure 1, while lower government spending will cause AD to shift to the left, as in Figure 2. For example, U.S. government spending declined by 3.6% of GDP during the 1990s, from 22.2% of GDP in 1992 to 18.6% of GDP in 1999. However, from 2008 to 2009, U.S. government spending increased from 20.7% of GDP to 24.7% of GDP. If changes of a few percentage points of GDP seem small to you, remember that since GDP exceeded $14 trillion in 2009, a seemingly small change of 1.0% of GDP in annual spending is equal to more than $140 billion.

Tax policy can affect consumption and investment spending, too. Tax cuts for individuals will tend to increase consumption demand, while *tax inc*reases will tend to diminish it. Tax policy can also pump up investment demand by offering lower tax rates for corporations or tax reductions that benefit specific kinds of investment. Shifting C or I will shift the AD curve as a whole.

During a *recession*, when unemployment is high and many businesses are suffering low profits or even losses, the U.S. Congress often passes tax cuts. During the recession of 2001, for example, a tax cut was enacted into law. Figure 3 illustrates the effect of tax cuts using the AD-AS model. The original equilibrium during a recession is at point E_0, relatively far from the full employment level of output. The tax cut, by increasing consumption, shifts the AD curve to the right. At the new equilibrium (E_1), real GDP rises and unemployment falls and, because in this diagram the economy has not yet reached its potential or full employment level of GDP, any rise in the price level remains muted. Read the following feature to consider the question of whether economists favor tax cuts or oppose them.

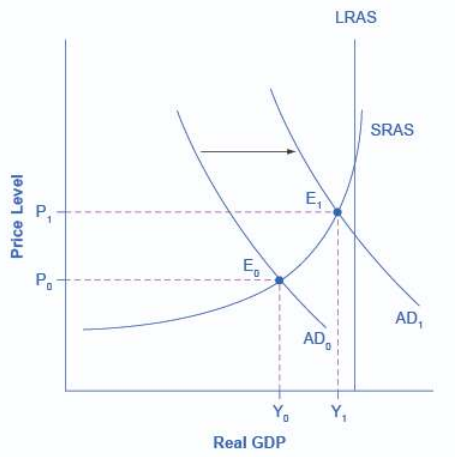


Figure 3. Recession and Full Employment in the AS–AD Model. Whether the economy is in a recession is illustrated in the AS–AD model by how close the equilibrium is to the potential GDP line. In this example, the level of output Y_0 at the equilibrium E_0 is relatively far from the potential GDP line, so it can represent an economy in recession, well below the full employment level of GDP. In contrast, the level of output Y_1 at the equilibrium E_1 is relatively close to potential GDP, and so it would represent an economy with a lower unemployment rate.

Try It

One of the most fundamental divisions in American politics over the last few decades has been between those who believe that the government should cut taxes substantially and those who disagree. Ronald Reagan rode into the presidency in 1980 partly because of his promise, soon carried out, to enact a substantial tax cut. George Bush lost his bid for reelection against Bill Clinton in 1992 partly because he had broken his 1988 promise: "Read my lips! No new taxes!" In the 2000 presidential election, both George W. Bush and Al Gore advocated substantial tax cuts and Bush succeeded in pushing a package of tax cuts through Congress early in 2001. Disputes over tax cuts often ignite at the state and local level as well.

What side are economists on? Do they support broad tax cuts or oppose them? The answer, unsatisfying to zealots on both sides, is that it depends. One issue is whether the tax cuts are accompanied by equally large government spending cuts. Economists differ, as does any broad cross-section of the public, on how large government spending should be and what programs might be cut back. A second issue, more relevant to the discussion in this chapter, concerns how close the economy is to the full employment level of output. In a recession, when the intersection of the AD and AS curves is far below the full employment level, tax cuts can make sense as a way of shifting AD to the right. However, when the economy is already doing extremely well, tax cuts may shift AD so far to the right as to generate inflationary pressures, with little gain to GDP.

With the AS–AD framework in mind, many economists might readily believe that the Reagan tax cuts of 1981, which took effect just after two serious recessions, were beneficial economic policy. Similarly, the Bush tax cuts of 2001 and the Obama tax cuts of 2009 were enacted during recessions. However, some of the same economists who favor tax cuts in time of recession would be much more dubious about identical tax cuts at a time such as 2017 when the economy is performing well and cyclical unemployment is low.

Government Policy Options

Changes in government spending and tax rates can be useful for influencing aggregate demand. Other policy tools can shift the aggregate demand curve as well. For example, the Federal Reserve can affect interest rates and the availability of credit. Higher interest rates tend to discourage borrowing and thus reduce both household spending on big-ticket items like houses and cars and investment spending by business. Conversely, lower interest rates will stimulate consumption and investment demand. Interest rates can also affect exchange rates, which in turn will have effects on the export and import components of aggregate demand.

Spelling out the details of these alternative policies and how they affect the components of aggregate demand can wait until we learn about the Keynesian Perspective in greater detail. Here, the key lesson is that a shift of the aggregate demand curve to the right leads to a greater real GDP and to upward pressure on the price level. Conversely, a shift of aggregate demand to the left leads to a lower real GDP and a lower price level. Whether these changes in output and price level are relatively large or relatively small, and how the change in equilibrium relates to potential GDP, depends on whether the shift in the AD curve is happening in the relatively flat or relatively steep portion of the AS curve.

Try It

https://assessments.lumenlearning.co...sessments/7519

https://assessments.lumenlearning.co...sessments/7520

Watch It

Watch this video to review aggregate demand and think about other things that may cause the aggregate demand curve to shift. Note that the video only mentions two reasons for a downward sloping AD curve (the wealth effect and the interest rate effect.) There is also a relative, or foreign, price effect, which says that as the aggregate price level rises, domestic goods and services become more expensive relative to imports. The result is a decrease in net export expenditures.

A link to an interactive elements can be found at the bottom of this page.

Any changes in C, I, G, or Xn (another way of depicting net exports) will shift demand. The video helped you consider the following situations. What will happen to the aggregate demand curve in each situation?

1. A significant boom in the stock market.
   [reveal-answer q="272672"]Show Answer[/reveal-answer]
   [hidden-answer a="272672"]C up, AD up[/hidden-answer]
2. A decrease in government spending.
   [reveal-answer q="86345"]Show Answer[/reveal-answer]
   [hidden-answer a="86345"]G down, AD down[/hidden-answer]
3. Widespread fear of recession.
   [reveal-answer q="283836"]Show Answer[/reveal-answer]
   [hidden-answer a="283836"]C down, I down, AD down[/hidden-answer]
4. Increase in incomes of trading partners.
   [reveal-answer q="545826"]Show Answer[/reveal-answer]
   [hidden-answer a="545826"]X up, AD up[/hidden-answer]

Try It

These questions allow you to get as much practice as you need, as you can click the link at the top of the first question ("Try another version of these questions") to get a new set of questions. Practice until you feel comfortable doing the questions.

[ohm_question]152966-152967-152906-152133[/ohm_question]

Learning Objectives

[glossary-page] [glossary-term]business confidence: [/glossary-term]
[glossary-definition]If businesses feel more confident, ceteris paribus, then firms tend to spend more on investment, believing that the future payoff from that investment will be substantial; if business confidence drops, then investment spending declines[/glossary-definition][glossary-term]consumer confidence:[/glossary-term][glossary-definition] when consumers feel more confident about the future of the economy, ceteris paribus, they tend to increase spending; when they feel less confident they tend to decrease spending[/glossary-definition][glossary-term]demand shocks: [/glossary-term][glossary-definition]events that shift the aggregate demand curve[/glossary-definition][glossary-term]positive demand shock: [/glossary-term][glossary-

definition]a rightward shift in AD [/glossary-definition][glossary-term]negative demand shock:[/glossary-term][glossary-definition] a leftward shift in AD[/glossary-definition] [/glossary-page]

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8.8: Shifts in Aggregate Supply

Learning Objectives

- Explain how productivity growth and changes in input prices change the aggregate supply curve

Shifts in Aggregate Supply

In this section we introduce **supply shocks.** Supply shocks are events that shift the aggregate supply curve. We defined the AS curve as showing the quantity of real GDP producers will supply at any aggregate price level. When the aggregate supply curve shifts to the right, then at every price level, a greater quantity of real GDP is produced. This is called a **positive supply shock.** When the AS curve shifts to the left, then at every price level, a lower quantity of real GDP is produced. This is a **negative supply shock**. This module discusses two of the most important supply shocks: productivity growth and changes in input prices.

How Productivity Growth Shifts the AS Curve

A link to an interactive elements can be found at the bottom of this page.

Figure 1 (Interactive Graph). Shifts in Aggregate Supply. Productivity growth shifts AS to the right.

A shift in the SRAS curve to the right will result in a greater real GDP and downward pressure on the price level, if aggregate demand remains unchanged. However, productivity grows slowly, at best only a few percentage points per year. As a consequence, the resulting shift in SRAS, increase in Q and decrease in P will be relatively small over a few months or even a couple of years.

How Changes in Input Prices Shift the AS Curve

Higher prices for inputs that are widely used across the entire economy, such as labor or energy, can have a macroeconomic impact on aggregate supply. Increases in the price of such inputs represent a negative supply shock, shifting the SRAS curve to shift to the left. This means that at each given price level for outputs, a higher price for inputs will discourage production because it will reduce the possibilities for earning profits. The interactive graph below (Figure 2) shows the aggregate supply curve shifting to the left, from $SRAS_0$ to $SRAS_1$, causing the equilibrium to move from E_0 to E_1. The movement from the original equilibrium of E_0 to the new equilibrium of E_1 will bring a nasty set of effects: reduced GDP or recession, higher unemployment because the economy is now further away from potential GDP, and an inflationary higher price level as well. For example, the U.S. economy experienced recessions in 1974–1975, and 1980–1981 that were each preceded or accompanied by a rise in oil prices. In the 1970s, this pattern of a shift to the left in AS leading to a stagnant economy with high unemployment and inflation was nicknamed **stagflation**.

An interactive or media element has been excluded from this version of the text. You can view it online here: http://pb.libretexts.org/mlum/?p=365

Figure 2 (Interactive Graph). Shifts in Aggregate Supply. Higher prices for key inputs shifts AS to the left.

Conversely, a decline in the price of a key input like oil, represents a positive supply shock shifting the SRAS curve to the right, providing an incentive for more to be produced at every given price level for outputs. From 1985 to 1986, for example, the average price of crude oil fell by almost half, from $24 a barrel to $12 a barrel. Similarly, from 1997 to 1998, the price of a barrel of crude oil dropped from $17 per barrel to $11 per barrel. In both cases, the plummeting price of oil led to a situation like that presented earlier in Figure 1, where the outward shift of SRAS to the right allowed the economy to expand, unemployment to fall, and inflation to decline.

Try It

https://assessments.lumenlearning.co...sessments/7522

Other Supply Shocks

Along with wages and energy prices, another source of supply shocks is the cost of imported goods that are used as inputs for domestically-produced products. In these cases as well, the lesson is that lower prices for inputs cause SRAS to shift to the right, while higher prices cause it to shift back to the left.

Try It

https://assessments.lumenlearning.co...sessments/7521

Similarly, an unexpected early freeze could destroy a large number of agricultural crops, a shock that would shift the AS curve to the left since there would be fewer agricultural products available at any given price.

When Does A Supply Shock Shift Potential GDP?

This important question really answers itself. Suppose there is a decrease in aggregate demand, which is shown by a leftward shift in AD, as shown in Figure 2. In the short term, wages are sticky and output decreases along the SRAS, as we move from E_1 to E_2. Over time, wages decrease and as they do, the SRAS shifts to the right due to the increase in firms' cost of production. The SRAS continues to shift until GDP has returned to potential. Graphically, we move from E_2 to E_3. Because this event was caused by a demand shock (i.e. a shift in AD), it had no effect on potential GDP. The supply of labor didn't change, nor did labor productivity so LRAS stays constant, though SRAS shifted. LRAS shifts only when the potential GDP increases or decreases.

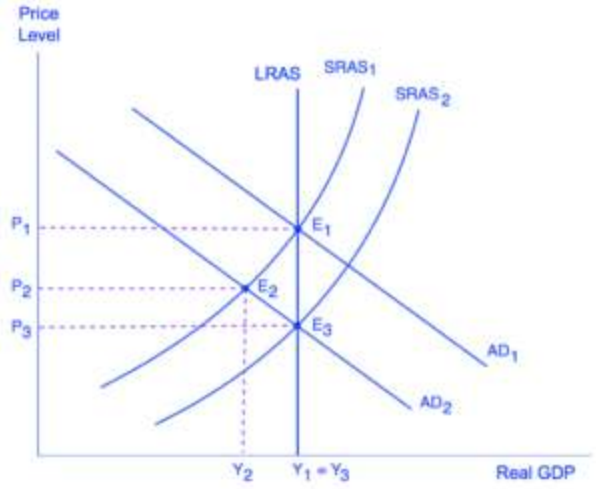


Figure 3. A Demand Shock. When AS shifts *in response to* a shift in AD, potential GDP (and LRAS) is unchanged. Rather, the model adjusts back to the original potential GDP, moving from E_1 to E_3.

Watch It

Review things that shift aggregate supply in the following video.

A link to an interactive elements can be found at the bottom of this page.

The video went over the following scenarios. Take a second look and quiz yourself on what will happen to aggregate supply in each situation.

1. A significant increase in nominal wages.
   [reveal-answer q="193890"]Show Answer[/reveal-answer]
   [hidden-answer a="193890"]Costs up, AS down[/hidden-answer]
2. An increase in physical capital.
   [reveal-answer q="468587"]Show Answer[/reveal-answer]
   [hidden-answer a="468587"]Productivity up, AS up[/hidden-answer]
3. A decrease in corporate taxes on producers.
   [reveal-answer q="860069"]Show Answer[/reveal-answer]
   [hidden-answer a="860069"]Production up, AS up[/hidden-answer]
4. An increase in expected inflation.
   [reveal-answer q="194358"]Show Answer[/reveal-answer]
   [hidden-answer a="194358"]Costs up, AS down[/hidden-answer]

Try It

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[ohm_question]152964-152965-152904-152905[/ohm_question]

Learning Objectives

[glossary-page][glossary-term]negative supply shock:[/glossary-term]
[glossary-definition] a leftward shift in the SRAS and LRAS curves [/glossary-definition][glossary-term]positive supply shock: [/glossary-term][glossary-definition] a rightward shift in the SRAS and LRAS curves[/glossary-definition][glossary-term]stagflation: [/glossary-term]
[glossary-definition]an economy experiences stagnant growth and high inflation at the same time[/glossary-definition] [glossary-term]supply shock: [/glossary-term][glossary-definition]an event that shifts both short run and long run aggregate supply curves[/glossary-definition][/glossary-page]

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8.9: Introduction to the AD–AS Model and Economic Growth

What you'll learn to do: illustrate economic growth, unemployment, and inflation using the AD-AS model



In this section, we consider how the AD-AS model illustrates the three macroeconomic goals: economic growth, low unemployment, and low inflation.

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8.10: Business Cycles and Growth in the AD–AS Model

Learning Objectives

- Use the aggregate demand-aggregate supply model to explain recessions, expansions and economic growth
- Explain how unemployment and inflation can be explained using the aggregate demand-aggregate supply model
- Evaluate the importance of the aggregate demand-aggregate supply model

Business Cycles in the AD-AS Model

Business cycles represent the slowing down, declining and speeding up of the economy, or more formally, recessions and expansions. The AD-AS model gives us one way to understand business cycles. Recessions occur as a result of negative demand or supply shocks, which cause the equilibrium level of real GDP to fall substantially below potential GDP, as occurred at the equilibrium point E_1 in Figure 1.

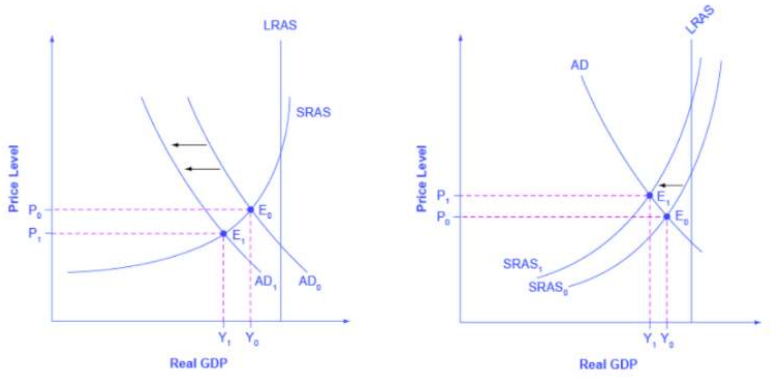


Figure 1. Aggregate Demand and Supply Shift Left. Recessions can be caused by negative shocks to either aggregate demand or aggregate supply. (a) A decrease in consumer confidence or business confidence can shift AD to the left, from AD_0 to AD_1. When AD shifts to the left, the new equilibrium (E_1) will have a lower quantity of output and also a lower price level compared with the original equilibrium (E_0). In this example, the new equilibrium (E_1) is also farther below potential GDP. A decrease in government spending or higher taxes that leads to a fall in consumer spending can also shift AD to the left. (b) An increase in the cost of critical inputs can shift AS to the left, from $SRAS_0$ to $SRAS_1$. When SRAS shifts to the left, the new equilibrium (E_1) will have a lower quantity of output and a higher price level compared with the original equilibrium (E_0). In this example, the new equilibrium (E_1) is also farther below potential GDP.

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Unemployment in the AD–AS Diagram

Recall that cyclical unemployment is unemployment to fluctuates with the business cycle. In the AD–AS diagram, cyclical unemployment is shown by how close the economy is to the potential or full employment level of GDP. Returning to Figure 1 above, cyclical unemployment increases when the output falls substantially below potential GDP on the AD–AS diagram, as at the equilibrium point E_0.

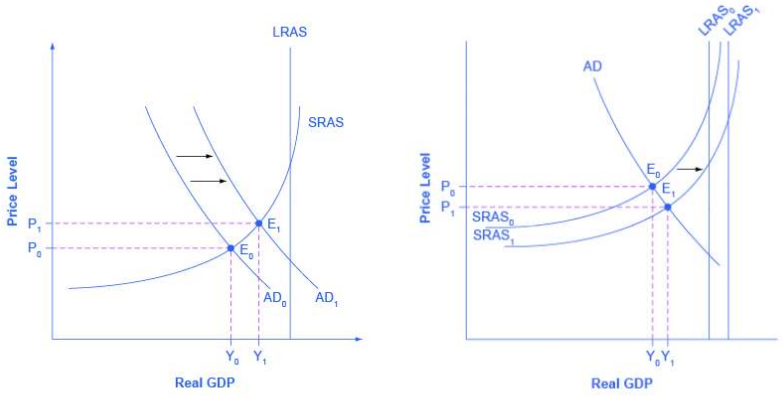


Figure 2. Rightward Shifts in Aggregate Demand or Supply. As the economy expands, either in response to a positive demand shock, shown in frame (a), or in response to a positive supply shock, shown in frame (b), real GDP increases, reducing cyclical unemployment.

Expansions occur as a result of positive demand or supply shocks, which cause the equilibrium level of real GDP to rise towards, and sometimes beyond, potential GDP, as occurred at the equilibrium point E1 in Figure 2. As GDP rises, cyclical unemployment falls.

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Inflationary Pressures in the AD–AS Diagram

Inflation fluctuates in the short run. Higher inflation rates have typically occurred either during or just after economic booms: for example, the biggest spurts of inflation in the U.S. economy during the twentieth century followed the wartime booms of World War I and World War II. Conversely, rates of inflation decline during recessions. As an extreme example, inflation actually became negative—a situation called "deflation"—during the Great Depression. Even during the relatively short recession of 1991–1992, the rate of inflation declined from 5.4% in 1990 to 3.0% in 1992. During the relatively short recession of 2001, the rate of inflation declined from 3.4% in 2000 to 1.6% in 2002. During the deep recession of 2007–2009, the rate of inflation declined from 3.8% in 2008 to –0.4% in 2009. Some countries have experienced bouts of high inflation that lasted for years. In the U.S. economy since the mid–1980s, inflation does not seem to have had any long-term trend to be substantially higher or lower; instead, it has stayed in the range of 1–5% annually.

The AD–AS framework implies two ways that inflationary pressures may arise. One possible trigger is if aggregate demand continues to shift to the right when the economy is already at or near potential GDP and full employment, thus pushing the macroeconomic equilibrium into the steep portion of the AS curve. In Figure 3(a), there is a shift of aggregate demand to the right; the new equilibrium E_1 is clearly at a higher price level than the original equilibrium E_0. In this situation, the aggregate demand in the economy has soared so high that firms in the economy are not capable of producing additional goods, because labor and physical capital are fully employed, and so additional increases in aggregate demand can only result in a rise in the price level.

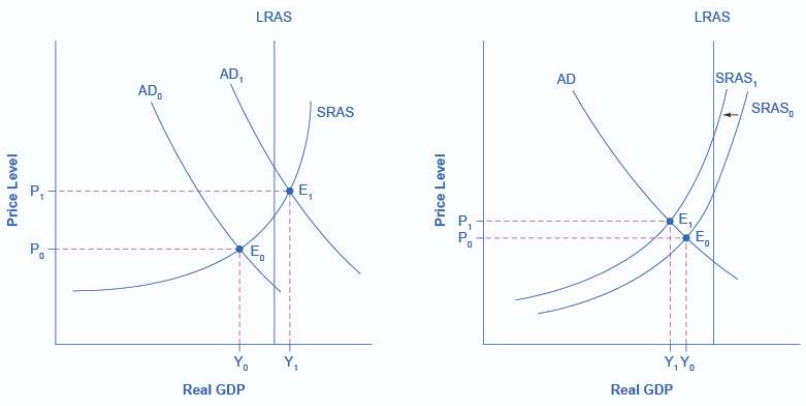


Figure 3. Sources of Inflationary Pressure in the AD–AS Model. (a) A shift in aggregate demand, from AD_0 to AD_1, when it happens in the area of the AS curve that is near potential GDP, will lead to a higher price level and to pressure for a higher price level and inflation. The new equilibrium (E_1) is at a higher price level (P_1) than the original equilibrium. (b) A shift in aggregate supply, from AS_0 to AS_1, will lead to a lower real GDP and to pressure for a higher price level and inflation. The new equilibrium (E_1) is at a higher price level (P_1), while the original equilibrium (E_0) is at the lower price level (P_0).

An alternative source of inflationary pressures can occur due to a rise in input prices that affects many or most firms across the economy—perhaps an important input to production like oil or labor—and causes the aggregate supply curve to shift back to the left. In Figure 3(b), the shift of the AS curve to the left also increases the price level from P_0 at the original equilibrium (E_0) to a higher price level of P_1 at the new equilibrium (E_1). In effect, the rise in input prices ends up, after the final output is produced and sold, being passed along in the form of a higher price level for outputs.

The AD–AS diagram shows only a one-time shift in the price level. It does not address the question of what would cause inflation either to vanish after a year, or to sustain itself for several years. There are two explanations for why inflation may persist over time. One way that continual inflationary price increases can occur is if the government continually attempts to stimulate aggregate demand in a way that keeps pushing the AD curve when it is already in the steep portion of the AS curve. A second possibility is that, if inflation has been occurring for several years, a certain level of inflation may come to be expected. For example, if consumers, workers, and businesses all expect prices and wages to rise by a certain amount, then these expected rises in the price level can become built into the annual increases of prices, wages, and interest rates of the economy. These two reasons are interrelated, because if a government fosters a macroeconomic environment with inflationary pressures, then people will grow to expect inflation. However, the AD–AS diagram does not show these patterns of ongoing or expected inflation in a direct way.

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Economic Growth in the AD-AS Model

In the AD–AS diagram, long-run economic growth due to productivity increases over time will be represented by a gradual shift to the right of aggregate supply. The vertical line representing potential GDP (or the "full employment level of GDP") will gradually shift to the right over time as well. A pattern of economic growth over three years, with the AS curve shifting slightly out to the right each year, was shown earlier in Figure 2(b).

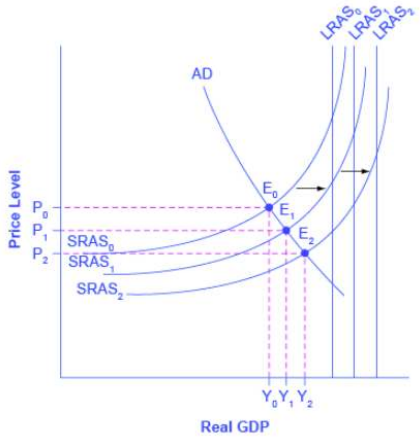


Figure 4. Economic Growth. The rise in productivity causes the AS curve to shift to the right. The original equilibrium E_0 is at the intersection of AD and AS_0. When AS shifts right, then the new equilibrium E_1 is at the intersection of AD and AS_1, and then yet another equilibrium, E_2, is at the intersection of AD and AS_2. Shifts in AS to the right, lead to a greater level of output and to downward pressure on the price level.

However, the factors that determine the speed of this long-term economic growth rate—like investment in physical and human capital, technology, and whether an economy can take advantage of catch-up growth—do not appear directly in the AS–AD diagram. In the short run, GDP falls and rises in every economy, as the economy dips into recession or expands out of recession.

LINK IT UP

What is the level of consumer confidence today? Visit this website for quick look at current data on consumer confidence. Or visit this website for current data on business confidence.

Watch It

Review and summarize these concepts you've learned about the aggregate demand-aggregate supply model in the following video.

A link to an interactive elements can be found at the bottom of this page.

Importance of the Aggregate Supply–Aggregate Demand Model

Macroeconomics takes an overall view of the economy, which means that it needs to juggle many different concepts. For example, start with the three macroeconomic goals of growth, low inflation, and low unemployment. Aggregate demand has four elements: consumption, investment, government spending, and exports less imports. Aggregate supply reveals how businesses throughout the economy will react to a higher price level for outputs. Finally, a wide array of economic events and policy decisions can affect aggregate demand and aggregate supply, including government tax and spending decisions; consumer and business confidence; changes in prices of key inputs like oil; and technology that brings higher levels of productivity. The aggregate demand–aggregate supply model is one of the fundamental diagrams in this text because it provides an overall framework for bringing these factors together in one diagram. Indeed, some version of the AS–AD model will appear in every module in the rest of this text.

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8.11: Learn By Doing- Business Cycles and Growth in the AD–AS Model

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8.12: Putting It Together- The Aggregate Demand-Aggregate Supply Model

The goal of this module was ambitious: to introduce you to the aggregate demand-aggregate supply model, the primary model we will use to study the macro economy. In this module, we learned that AD-AS isn't just a graphical model, but a tool to analyze and understand almost anything that has an impact on the macro economy. We also learned that AD and AS are not just curves, but that they reflect underlying economic behaviors by consumers, producers, governments and foreigners.

FROM HOUSING BUBBLE TO HOUSING BUST



Figure 1. During the housing boom, aggregate demand increased and the curve shifted to the right. After the bubble burst, the AD shifted left, which contributed to high unemployment and the Great Recession.

Economic fluctuations, whether those experienced during the Great Depression of the 1930s, the stagflation of the 1970s, or the Great Recession of 2008–2009, can be explained using the AD/AS diagram. Short-run fluctuations in output occur due to shifts of the SRAS curve, the AD curve, or both. In the case of the housing bubble, rising home values caused the AD curve to shift to the right as more people felt that rising home values increased their overall wealth. Many homeowners took on mortgages that exceeded their ability to pay because, as home values continued to go up, the increased value would pay off any debt outstanding. Increased wealth due to rising home values lead to increased home equity loans and increased spending. All these activities pushed AD to the right, contributing to low unemployment rates and economic growth in the United States. When the housing bubble burst, overall wealth dropped dramatically, wiping out the recent gains. This drop in the value of homes was a demand shock to the U.S. economy because of its impact directly on the wealth of the household sector, and its contagion into the financial that essentially locked up new credit. The AD curve shifted to the left as evidenced by the rising unemployment of the Great Recession.

Understanding the source of these macroeconomic fluctuations provided monetary and fiscal policy makers with insight about what policy actions to take to mitigate the impact of the housing crisis. From a monetary policy perspective, the Federal Reserve lowered short-term interest rates to between 0% and 0.25%, to loosen up credit throughout the financial system. Discretionary fiscal policy measures included the passage of the Emergency Economic Stabilization Act of 2008 that allowed for the purchase of troubled assets, such as mortgages, from financial institutions and the American Recovery and Reinvestment Act of 2009 that increased government spending on infrastructure, provided for tax cuts, and increased transfer payments. In combination, both monetary and fiscal policy measures were designed to help stimulate aggregate demand in the U.S. economy, pushing the AD curve to the right.

While most economists agree on the usefulness of the AD/AS diagram in analyzing the sources of these fluctuations, there is still some disagreement about the effectiveness of policy decisions that are useful in stabilizing these fluctuations. We discuss the possible policy actions and the differences among economists about their effectiveness in more detail in the remaining modules, including those on the Keynesian and Neoclassical perspectives, and monetary and fiscal policies.

Beginning in the next module, you will see that economists differ on the relative importance they place on changes in spending versus changes in factors of production as drivers of economic activity. They also differ on what they see as the appropriate role of government in the process.

While you may not feel you fully understand this material yet, as you work with it during the remainder of this text, your learning will be reinforced and your understanding will become more complete.

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8.13: Discussion- The Business Cycle and the AD-AS Model

Respond to the following prompt in a post with a minimum of 200 words, then comment on at least TWO other posts.

- While over the long run, the economy grows about 2 to 3% per year on average, over the shorter term, the economy goes through business cycles. Think about the growth rate of GDP, the inflation rate, and the unemployment rate over the last 12 quarters. Once you've looked at the data, can you draw conclusions about the state of the economy? Would you describe the economy as booming, recovering, or in recession during the last few years? Why? Use the AD-AS model to illustrate this graphically. Which curve do you think caused the change? Explain your reasoning.

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8.14: Assignment- Analysis of a Demand/Supply Shock using the AD-AS Model

Imagine that in the year 2022, China's economy slows significantly, causing a decrease in demand for US exports.

Use the AD/AS model to explain the likely short run impacts on U.S. GDP and the aggregate price level. What do you anticipate will happen to U.S. consumption expenditure and U.S. employment? Please explain your reasoning for each of your predictions and show graphically as appropriate.

Rubric

Criteria	Not Evident	Developing	Proficient	Distinguished	Weight
Explain the likely short run impacts on U.S. GDP using the AD/AS model					4
Explain the likely aggregate price level use the AD/AS model					4
Create a graphic to illustrate the anticipated result to U.S. consumption expenditure and U.S. employment					5
Explain the anticipated result to U.S. consumption expenditure and U.S. employment					5
Articulation of response (citations, grammar, spelling, syntax, or organization that negatively impact readability and articulation of main ideas.)					2
					Total: 20

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8.15: Assignment- Problem Set — The Aggregate Demand-Aggregate Supply Model

Click on the following link to download the problem set for this module:

- The Aggregate Demand-Aggregate Supply Model Problem Set

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CHAPTER OVERVIEW

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9.1: Why It Matters- Keynesian and Neoclassical Economics

Why learn to identify and apply the key features of Keynesian and neoclassical economic models?

Macroeconomic theory is both interesting and challenging because there is no single, universally accepted view about either how the economy works or what the appropriate role for government macro policy should be. Throughout history, there have been two competing perspectives about these questions, which we call Keynesian and Neoclassical economics. The views have had different names at different times, such as Classical and New Classical economics or Neo Keynesian and New Keynesian economics, but while these views have become more nuanced, the basic perspectives have remained the same. Both groups agree that aggregate demand and aggregate supply affect the course of the macro economy. Neoclassicals, though, argue that supply is the most important determinant, while demand just tags along, while Keynesians argue the opposite.

Many mainstream economists take a Keynesian perspective (emphasizing the important of aggregate demand) in analyzing the short run, but a neoclassical perspective (emphasizing the importance of aggregate supply) for analyzing the long run.



Figure 1. Signs of a Recession Home foreclosures were just one of the many signs and symptoms of the recent Great Recession. During that time, many businesses closed and many people lost their jobs. (Credit: modification of work by Taber Andrew Bain, CC BY).

The Great Recession and Economic Solutions

The Great Recession of 2008–2009 hit the U.S. economy hard. According to the Bureau of Labor Statistics (BLS), the number of unemployed Americans rose from 6.8 million in May 2007 to 15.4 million in October 2009. During that time, the U.S. Census Bureau estimated that approximately 170,000 small businesses closed. Mass layoffs peaked in February 2009 when 326,392 workers were given notice. U.S. productivity and output fell as well. Job losses, declining home values, declining incomes, and uncertainty about the future caused consumption expenditures to decrease. According to the BLS, household spending dropped by 7.8%.

Home foreclosures and the meltdown in U.S. financial markets called for immediate action by Congress, the President, and the Federal Reserve Bank. For example, programs such as the American Recovery and Reinvestment Act of 2009 were implemented to help millions of people by providing tax credits for homebuyers, paying “cash for clunkers” (a program for buying back used cars), and extending unemployment benefits. From cutting back on spending, filing for unemployment, and losing homes, millions of people were affected by the recession. And while the United States is now on the path to recovery, the impact will be felt for many years to come.

What caused this recession and what prevented the economy from spiraling further into another depression? Policymakers looked to the lessons learned from the Great Depression of the 1930s and to the models developed by John Maynard Keynes to analyze the causes and find solutions to the country’s economic woes.

We have learned that the level of economic activity, for example output, employment, and spending, tends to grow over time. We learned earlier that the economy tends to cycle around the long-run trend. In other words, the economy does not always grow at its average growth rate. Sometimes economic activity grows at the trend rate, sometimes it grows more than the trend, sometimes it grows less than the trend, and sometimes it actually declines. You can see this cyclical behavior in Figure 2.

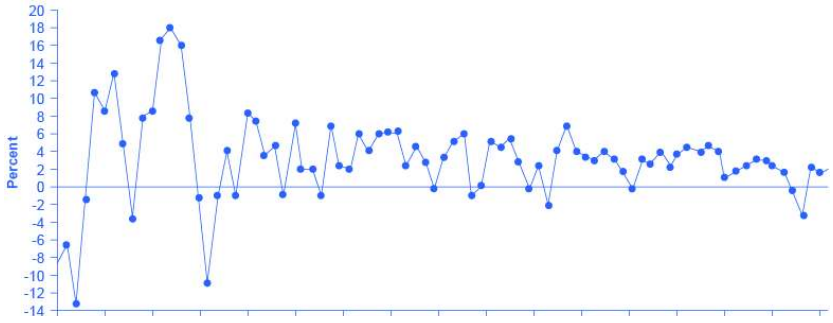


Figure 2.U.S. Gross Domestic Product, Percent Changes 1930–2012. The chart tracks the percent change in GDP since 1930. The magnitude of both recessions and peaks was quite large between 1930 and 1945. (Source: Bureau of Economic Analysis, "National Economic Accounts").

This empirical reality raises two important questions: how can we explain the cycles, and to what extent can they be moderated? To answer those questions, we turn to the Keynesian and neoclassical perspectives.

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9.2: Balancing Keynesian and Neoclassical Models

Learning Objectives

- Identify the strengths and weaknesses of the Keynesian and neoclassical models

Balancing Keynesian and Neoclassical Models



Figure 1. While it may seem like the Keynesian and neoclassical perspectives are like two horses riding in different directions, both models offer important insights into economic behavior and can be applied in different situations.

Finding the balance between Keynesian and neoclassical models can be compared to the challenge of riding two horses simultaneously. When a circus performer stands on two horses, with a foot on each one, much of the excitement for the viewer lies in contemplating the gap between the two. As modern macroeconomists ride into the future on two horses—with one foot on the short-term Keynesian perspective and one foot on the long-term neoclassical perspective—the balancing act may look uncomfortable, but there does not seem to be any way to avoid it. Each approach, Keynesian and neoclassical, has its strengths and weaknesses.

The short-term Keynesian model, built on the importance of aggregate demand as a cause of business cycles and a degree of wage and price rigidity, does a sound job of explaining many recessions and why cyclical unemployment rises and falls. By focusing on

the short-run adjustments of aggregate demand, Keynesian economics risks overlooking the long-term causes of economic growth or the natural rate of unemployment that exists even when the economy is producing at potential GDP.

Table 1. Comparing the Keynesian and Neoclassical Models

	Keynesian	Neoclassical
Focus	Focus on the short run	Focus on the long run
What determines GDP?	Aggregate demand (AD)	Aggregate supply (AS)
Is aggregate demand stable?	Keynesians believe that AD is unstable (private sector spending varies a lot); thus fiscal and monetary policy are necessary to offset the resulting business cycles.	Neoclassicals believe that AD is relatively stable.
How responsive are wages and prices to changes in demand?	Keynesians believe wages and prices adjust slowly in response to changes in demand. Prices are sticky.	Neoclassicals believe wages & prices adjust quickly in response to changes in demand. Prices are flexible.
Intervening in the economy	Keynesians encourage stimulating the economy during recessionary times and slowing the economy down during booms, using a combination of fiscal and monetary policy.	Neoclassicals advocate a hands-off, or fairly limited, role for active stabilization policy.
Policy implications in the short run	Keynesians believe fiscal and monetary policy should be used actively in the short run to manage aggregate demand.	Neoclassicals believe that the economy is self-correcting, and attempting to fine-tune the economy through monetary and fiscal policies makes problems worse.
Policy implications in the long run	Keynesians believe fiscal and monetary policy in the long run should be devoted to increasing potential GDP. Tax cuts on business investment can help, as well as investing into public infrastructure.	Neoclassicals believe fiscal policy (primarily in the form of tax cuts) should be devoted to increasing potential GDP through stimulating physical and human capital.

The neoclassical model, with its emphasis on aggregate supply, focuses on the underlying determinants of output and employment in markets, and thus tends to put more emphasis on economic growth and how labor markets work. However, the neoclassical view is not especially helpful in explaining why unemployment moves up and down over short time horizons of a few years. Nor is the neoclassical model especially helpful when the economy is mired in an especially deep and long-lasting recession, like the Great Depression of the 1930s. Keynesian economics tends to view inflation as a price that might sometimes be paid for lower unemployment; neoclassical economics tends to view inflation as a cost that offers no offsetting gains in terms of lower unemployment.

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Macroeconomics cannot, however, be summed up as an argument between one group of economists who are pure Keynesians and another group who are pure neoclassicists. Instead, many mainstream economists believe both the Keynesian and neoclassical perspectives. Robert Solow, the Nobel laureate in economics in 1987, described the dual approach in this way:

At short time scales, I think, something sort of 'Keynesian' is a good approximation, and surely better than anything straight 'neoclassical.' At very long time scales, the interesting questions are best studied in a neoclassical framework, and attention to the Keynesian side of things would be a minor distraction. At the five-to-ten-year time scale, we have to piece things together as best we can, and look for a hybrid model that will do the job.

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Many modern macroeconomists spend considerable time and energy trying to construct models that blend the most attractive aspects of the Keynesian and neoclassical approaches. It is possible to construct a somewhat complex mathematical model where aggregate demand and sticky wages and prices matter in the short run, but wages, prices, and aggregate supply adjust in the long run. However, creating an overall model that encompasses both short-term Keynesian and long-term neoclassical models is not easy.

Keynesian and Neoclassical models and the GReat Recession

The Great Recession ended in June 2009 after 18 months, according to the National Bureau of Economic Research (NBER). The NBER examines a variety of measures of economic activity to gauge the economy's overall health. These measures include real income, wholesale and retail sales, employment, and industrial production. In the years since the official end of this historic economic downturn, it has become clear that the Great Recession was two-pronged, hitting the U.S. economy with the collapse of the housing market and the failure of the financial system's credit institutions, further contaminating global economies. While the stock market rapidly lost trillions of dollars of value, consumer spending dried up, and companies began cutting jobs, economic policymakers were struggling with how to best combat and prevent a national, and even global economic collapse. The Congress passed the American Recovery and Reinvestment Act in early 2009 which provided some $800 billion worth of fiscal stimulus through tax cuts and government spending increases.

Were the policies implemented to stabilize the economy and financial markets during the Great Recession effective? Many economists from both the Keynesian and neoclassical schools have found that they were, although to varying degrees. Alan Blinder of Princeton University and Mark Zandi for Moody's Analytics found that, without fiscal policy, GDP decline would have been significantly more than its 3.3% in 2008 followed by its 0.1% decline in 2009. They also estimated that there would have been 8.5 million more job losses had the government not intervened in the market with the TARP to support the financial industry and key automakers General Motors and Chrysler. Federal Reserve Bank economists Carlos Carvalho, Stefano Eusip, and Christian Grisse found in their study, *Policy Initiatives in the Global Recession: What Did Forecasters Expect?* that once policies were implemented, forecasters adapted their expectations to these policies. They were more likely to anticipate increases in investment due to lower interest rates brought on by monetary policy and increased economic growth resulting from fiscal policy.

The difficulty with evaluating the effectiveness of the stabilization policies that were taken in response to the Great Recession is that we will never know what would have happened had those policies not have been implemented. Surely some of the programs were more effective at creating and saving jobs, while other programs were less so. The final conclusion on the effectiveness of macroeconomic policies is still up for debate, and further study will no doubt consider the impact of these policies on the U.S. budget and deficit, as well as the value of the U.S. dollar in the financial market.

The Keynesian perspective considers changes to aggregate demand to be the cause of business cycle fluctuations. Keynesians are likely to advocate that policy makers actively attempt to reverse recessionary and inflationary periods because they are not convinced that the self-correcting economy can easily return to full employment.

The neoclassical perspective places more emphasis on aggregate supply. The level of potential GDP is determined by long term productivity growth and that the economy typically will return to full employment after a change in aggregate demand. Skeptical of the effectiveness and timeliness of Keynesian policy, neoclassical economists are more likely to advocate a hands-off, or fairly limited, role for active stabilization policy.

While Keynesians would tend to advocate an acceptable tradeoff between inflation and unemployment when counteracting a recession, neoclassical economists argue that no such tradeoff exists; any short-term gains in lower unemployment will eventually vanish and the result of active policy will only be inflation.

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9.3: Putting It Together- Keynesian and Neoclassical Economics

Keynesian economics argues that the macro economy is inherently unstable, because aggregate demand, especially autonomous consumption, investment and net exports, tends to fluctuate. Thus, even if the economy starts at potential GDP and full employment, there's no reason to expect the economy will stay there.



If you believe the Keynesian approach, this implies that government has a strong motive to use activist policy to attempt to "stabilize" (or manage) the economy. In other words, if aggregate demand falls threatening a recession, government needs to act to stimulate aggregate demand, to return the economy to potential GDP. Similarly, if aggregate demand rises threatening inflation, the government should cut aggregate demand. We will explore these policy options in future modules on fiscal and monetary policy.

In the early 1970s, Keynesians believed that business cycles were caused primarily by shifts in the aggregate demand curve. Neoclassicals added to economists' understanding of the macro economy by observing that business cycles can also be caused by shifts in the short run aggregate supply curve.

While there are economists who consider themselves exclusively Keynesian or exclusively neoclassical, the majority believe that both perspectives have something to offer. Keynesian thinking makes sense over periods of time too short for wages and prices to adjust fully to demand or supply shocks. Neoclassical thinking makes sense over longer periods of time. Thus, Keynesian thinking is usually applied to understanding business cycles and neoclassical thinking to economic growth.

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9.4: Discussion- Keynesian vs. Neoclassical Economics

Respond to the following prompts in a post with a minimum of 200 words, then comment on at least TWO other posts.

- Thinking back to the business cycle discussion, how would Keynesian economists explain the performance of the economy during the last few years? What has happened to aggregate demand? What evidence can you present to support this position?
- Next, how would neoclassical economists explain the performance of the economy during the last few years? What has happened to aggregate supply? What evidence can you present to support this position?
- Evaluate the evidence and decide which interpretation makes the most sense to you. Explain your reasoning.

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9.5: Assignment- Keynesian and Neoclassical Economics

Take a look again at Figure 1 (originally from the page in the text titled “Neoclassical and Keynesian Perspectives in the AD-AS Model.”)

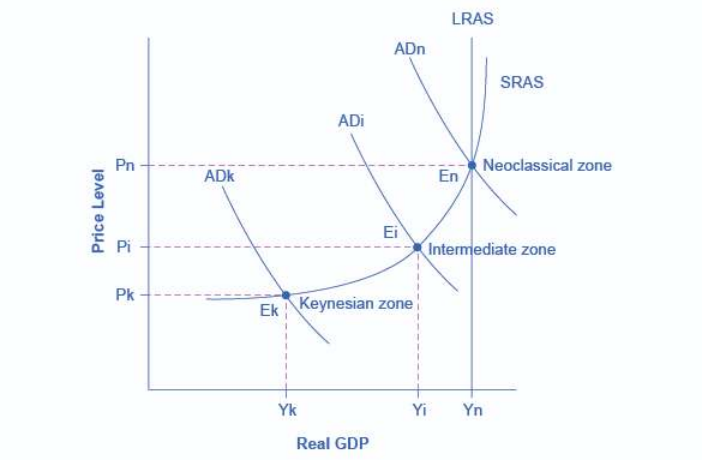


Figure 1. Keynes, Neoclassical, and Intermediate Zones in the Aggregate Supply Curve. Near the equilibrium Ek, in the Keynesian zone at the far left of the SRAS curve, small shifts in AD, either to the right or the left, will affect the output level Yk, but will not much affect the price level. In the Keynesian zone, AD largely determines the quantity of output. Near the equilibrium En, in the neoclassical zone at the far right of the SRAS curve, small shifts in AD, either to the right or the left, will have relatively little effect on the output level Yn, but instead will have a greater effect on the price level. In the neoclassical zone, the near-vertical SRAS curve close to the level of potential GDP largely determines the quantity of output. In the intermediate zone around equilibrium Ei, movement in AD to the right will increase both the output level and the price level, while a movement in AD to the left would decrease both the output level and the price level.

Think about a minor recession, like the one that occurred in 1990. (Hint: a minor recession could be caused by a slight shift to the left in the AD curve.)

What would a Keynesian likely recommend in response to a recession? What would a neoclassical likely recommend? Why would a Keynesian policy response not make much sense in response to a minor recession like the one that occurred in 1990? What would be the cost of letting the economy adjust by itself to a new long run equilibrium?

Now think about a major recession, like the one that occurred in 1982. (Hint: a major recession could be caused by a large shift to the left in the AD curve.) Why would a Keynesian policy make more sense in response to a major recession like the one that occurred in 1982? What would be the cost of following a neoclassical policy then?

Rubric

Criteria	Not Evident	Developing	Proficient	Distinguished	Weight
Identify an appropriate Keynesian policy response to a recession					4
Identify an appropriate Neoclassical policy response to a recession					4
Explain the cost of doing nothing in response to a minor recession					4
Explain the cost of doing nothing in response to a major recession					4
Make a case for why a Neoclassical policy makes more sense in response to a minor recession while a Keynesian response makes more sense in response to a major recession					4
					Total: 20

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9.6: Assignment- Problem Set — Keynesian and Neoclassical Economics

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9.7: Introduction to Keynesian Economics and the AD-AS Model

What you'll learn to do: describe the tenets of Keynesian Economics



In this section, you will learn about the basics behind Keynesian economics and analyze the AD-AS model through the lens of the Keynesian perspective.

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9.8: Aggregate Demand in Keynesian Analysis

Learning Objectives

- Describe aggregate demand, recessionary gaps, and inflationary gaps as they apply to Keynesian analysis
- Describe the Keynesian viewpoints on the determinants of consumption expenditure and investment expenditure
- Describe the Keynesian perspective on factors that determine government spending and net exports

Aggregate Demand in Keynesian Analysis

The Keynesian perspective focuses on aggregate demand. The idea is simple: firms produce output only if they expect it to sell. Thus, while the availability of the factors of production determines a nation's *potential GDP*, the amount of goods and services *actually* being produced and sold, i.e. real GDP, depends on how much demand exists across the economy. Suppose GDP is less than potential. Then changes in aggregate demand translate directly into changes in GDP, with no change in the price level. In short, real GDP is determined only by aggregate demand, not aggregate supply.

Watch It

Watch this video for an overview and introduction to Keynesian economics. We will explore the specifics from the video in more detail in this and subsequent modules.

An interactive or media element has been excluded from this version of the text. You can view it online here: http://pb.libretexts.org/mlum/?p=387

The importance of aggregate demand is illustrated in Figure 1, which shows a pure Keynesian AD-AS model. The aggregate supply curve (AS) is horizontal at GDP levels less than potential, and vertical once Yp is reached. Thus, when beginning from potential output, any decrease in AD affects only output, but not prices; any increase in AD affects only prices, not output.

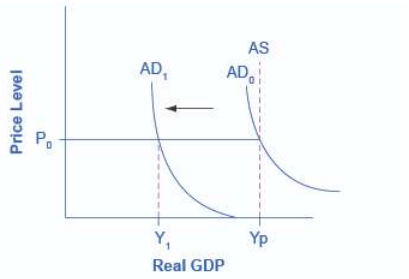


Figure 1. The Pure Keynesian AD–AS Model. The Keynesian View of the AD–AS Model uses an AS curve which is horizontal at levels of output below potential and vertical at potential output. Thus, changes in AD only affect GDP when below potential output, but only affect the price level when at potential output.

Keynes argued, for reasons we explain shortly, that aggregate demand is not stable—that it can change unexpectedly. Suppose the economy starts where AD intersects AS at P_0 and Yp. Because Yp is potential output, the economy is at full employment. Because AD is volatile, it can easily fall. Thus, even if we start at Yp, if AD falls, then we find ourselves in what Keynes termed a **recessionary gap**. The economy is in equilibrium but with less than full employment, as shown at Y_1 in the Figure 1. Keynes believed that the economy would tend to stay in a recessionary gap, with its attendant unemployment for a significant period of time.

In the same way (though not shown in the figure), if AD increases, the economy could experience an **inflationary gap**, where demand is attempting to push the economy past potential output. As a consequence, the economy experiences inflation. The key policy implication for either situation is that government needs to step in and fill the gap, increasing spending during recessions and decreasing spending during booms to return aggregate demand to match potential output.

Recall from previous reading in the module on aggregate demand and aggregate supply that **aggregate demand** is total spending, economy-wide, on domestic goods and services. (Aggregate demand (AD) is actually what economists call total planned

expenditure, which you'll learn more about soon). You may also remember that aggregate demand is the sum of four components: consumption expenditure, investment expenditure, government spending, and spending on net exports (exports minus imports). In the following sections, we will examine each component through the Keynesian perspective.

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What Determines Consumption Expenditure?

Consumption expenditure is spending by households and individuals on durable goods, nondurable goods, and services. Durable goods are things that last and provide value over time, such as automobiles. Nondurable goods are things like groceries—once you consume them, they are gone. Recall from previous readings that services are intangible things consumers buy, like healthcare or entertainment.

Keynes identified three factors that affect consumption:

- Disposable income: For most people, the single most powerful determinant of how much they consume is their take-home pay, that is, how much income they earn after taxes, also known as **disposable income**.
- Expected future income: Consumer expectations about future income also are important in determining consumption. If consumers feel optimistic about the future, they are more likely to spend and increase overall aggregate demand. News of recession and troubles in the economy will make them pull back on consumption.
- Wealth or credit: When households experience a rise in wealth, they may be willing to consume a higher share of their income and to save less. When the U.S. stock market rose dramatically in the late 1990s, for example, U.S. rates of spending increased, probably in part because people felt that their wealth had increased and there was less need to save. How do people spend beyond their income, when they perceive their wealth increasing? The answer is borrowing. On the other side, when the U.S. stock market declined about 40% from March 2008 to March 2009, people felt far greater uncertainty about their economic future, so rates of saving increased while consumption declined.

Finally, Keynes noted that a variety of other factors combine to determine how much people save and spend. If household preferences about saving shift in a way that encourages consumption rather than saving, then AD will shift out to the right.

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What Determines Investment Expenditure?

Spending on new capital goods is called investment expenditure. Investment falls into four categories: producer's durable equipment and software, nonresidential structures (such as factories, offices, and retail locations), changes in inventories, and residential structures (such as single-family homes, townhouses, and apartment buildings). The first three types of investment are conducted by businesses, while the last is conducted by households.

Keynes's treatment of investment focuses on the key role of expectations about the future in influencing business decisions. When a business decides to make an investment in physical assets, like plants or equipment, or in intangible assets, like skills or a research and development project, that firm considers both the expected benefits of the investment (expectations of future profits) and the costs of the investment (interest rates).

- Expectations of future profits: The clearest driver of the benefits of an investment is expectations for future profits. When an economy is expected to grow, businesses perceive a growing market for their products. Their higher degree of business confidence will encourage new investment. For example, in the second half of the 1990s, U.S. investment levels surged from 18% of GDP in 1994 to 21% in 2000. However, when a recession started in 2001, U.S. investment levels quickly sank back to 18% of GDP by 2002.
- Interest rates also play a significant role in determining how much investment a firm will make. Just as individuals need to borrow money to purchase homes, so businesses need financing when they purchase big ticket items. The cost of investment thus includes the **interest rate**. Even if the firm has the funds, the interest rate measures the opportunity cost of purchasing business capital. Lower interest rates stimulate investment spending and higher interest rates reduce it.

Many factors can affect the expected profitability on investment. For example, if the price of energy declines, then investments that use energy as an input will yield higher profits. If government offers special incentives for investment (for example, through the tax code), then investment will look more attractive; conversely, if government removes special investment incentives from the tax code, or increases other business taxes, then investment will look less attractive. As Keynes noted, business investment is the most variable of all the components of aggregate demand.

Try It

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What Determines Government Spending?

The third component of aggregate demand is spending by federal, state, and local governments. Although the United States is usually thought of as a market economy, government still plays a significant role in the economy. Government provides important public services such as national defense, transportation infrastructure, and education.

Keynes recognized that the government budget offered a powerful tool for influencing aggregate demand. Not only could AD be stimulated by more government spending (or reduced by less government spending), but consumption and investment spending could be influenced by lowering or raising tax rates. Indeed, Keynes concluded that during extreme times like deep recessions, only the government had the power and resources to move aggregate demand.

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What Determines Net Exports?

Recall that exports are products produced domestically and sold abroad while imports are products produced abroad but purchased domestically. Since aggregate demand is defined as spending on domestic goods and services, export expenditures add to AD, while import expenditures subtract from AD.

Two sets of factors can cause shifts in export and import demand: changes in relative growth rates between countries and changes in relative prices between countries. The level of demand for a nation's exports tends to be most heavily affected by what is happening in the economies of the countries that would be purchasing those exports. For example, if major importers of American-made products like Canada, Japan, and Germany have recessions, exports of U.S. products to those countries are likely to decline. Conversely, the quantity of a nation's imports is directly affected by the level of income in the domestic economy: more income will bring a higher level of imports.

Exports and imports can also be affected by relative prices of goods in domestic and international markets. If U.S. goods are relatively cheaper compared with goods made in other places, perhaps because a group of U.S. producers has mastered certain productivity breakthroughs, then U.S. exports are likely to rise. If U.S. goods become relatively more expensive, perhaps because a change in the exchange rate between the U.S. dollar and other currencies has pushed up the price of inputs to production in the United States, then exports from U.S. producers are likely to decline.

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This table summarizes the reasons given here for changes in aggregate demand.

Table 1. Determinants of Aggregate Demand

Reasons for a Decrease in Aggregate Demand	Reasons for an Increase in Aggregate Demand
Consumption • Rise in taxes • Fall in income • Rise in interest • Desire to save more • Decrease in wealth • Fall in future expected income	***Consumption*** • Decrease in taxes • Increase in income • Fall in interest rates • Desire to save less • Rise in wealth • Rise in future expected income
Investment • Fall in expected rate of return • Rise in interest rates • Drop in business confidence	***Investment*** • Rise in expected rate of return • Drop in interest rates • Rise in business confidence
Government • Reduction in government spending • Increase in taxes	***Government*** • Increase in government spending • Decrease in taxes
Net Exports • Decrease in foreign demand • Relative price increase of U.S. goods	***Net Exports*** • Increase in foreign demand • Relative price drop of U.S. goods

Glossary

[glossary-page][glossary-term]disposable income: [/glossary-term]
[glossary-definition]income after taxes[/glossary-definition]
[glossary-term]inflationary gap: [/glossary-term][glossary-definition]equilibrium at a level of output above potential GDP [/glossary-definition][glossary-term]interest rate: [/glossary-term][glossary-definition]the payment for borrowed money[/glossary-definition][glossary-term]recessionary gap: [/glossary-term][glossary-definition]equilibrium at a level of output below potential GDP[/glossary-definition][/glossary-page]

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9.9: The Core of Keynesian Analysis

Learning Objectives

- Describe the Keynesian view of recessions through an understanding of sticky wages, prices, and aggregate demand
- Explain the coordination argument, menu costs, and macroeconomic externalities as they relate to Keynesian economics

The Building Blocks of Keynesian Analysis

Now that we have a clear understanding of what constitutes aggregate demand, we return to the Keynesian argument using the model of aggregate demand and aggregate supply (AD–AS).

Keynesian economics focuses on explaining why recessions and depressions occur and offers a policy prescription for minimizing their effects. The Keynesian view of **recession** is based on two key building blocks:

1. First, aggregate demand is not always automatically high enough to provide firms with an incentive to hire enough workers to reach full employment.
2. Second, the macroeconomy may adjust only slowly to shifts in aggregate demand because of **sticky wages and prices**, which are wages and prices that do not respond quickly to decreases or increases in demand. We will consider these two claims in turn, and then see how they are represented in the AS–AD model.

Low Aggregate Demand

The first building block of the Keynesian diagnosis is that recessions occur when the level of household and business sector demand for goods and services is less than what is produced when labor is fully employed. In other words, the intersection of aggregate demand and aggregate supply occurs at a level of output less than the level of GDP consistent with full employment. Suppose the stock market crashes, as occurred in 1929. Or, suppose the housing market collapses, as occurred in 2008. In either case, household wealth will decline, and consumption expenditure will follow. Suppose businesses see that consumer spending is falling. That will reduce expectations of the profitability of investment, so businesses will decrease investment expenditure.This seemed to be the case during the Great Depression, since the physical capacity of the economy to supply goods did not alter much. No flood or earthquake or other natural disaster ruined factories in 1929 or 1930. No outbreak of disease decimated the ranks of workers. No key input price, like the price of oil, soared on world markets.

The U.S. economy in 1933 had just about the same factories, workers, and state of technology as it had had four years earlier in 1929—and yet the economy had shrunk dramatically. This also seems to be what happened in 2008. Although production capacity existed, businesses were not able to sell their products at the same rate. As a result, real GDP fell below potential GDP.

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Wage and Price Stickiness

Keynes also pointed out that although AD fell, prices and wages did not immediately respond as economists often expected. Instead, prices and wages are “sticky,” making it difficult to restore the economy to full employment and potential GDP. Keynes emphasized one particular reason why wages were sticky: the **coordination argument**. This argument points out that, even if most people would be willing—at least hypothetically—to see a decline in their own wages in bad economic times as long as everyone else also experienced such a decline, a market-oriented economy has no obvious way to implement a plan of coordinated wage reductions. Our earlier discussion of cyclical unemployment offered a number of reasons why wages might be sticky downward, most of which center on the argument that businesses avoid wage cuts because they may in one way or another depress morale and hurt the productivity of the existing workers.

Some modern economists have argued in a Keynesian spirit that, along with wages, other prices may be sticky, too. Many firms do not change their prices every day or even every month. When a firm considers changing prices, it must consider two sets of costs. First, changing prices uses company resources: managers must analyze the competition and market demand and decide what the new prices will be, sales materials must be updated, billing records will change, and product labels and price labels must be redone.

Second, frequent price changes may leave customers confused or angry—especially if they find out that a product now costs more than expected. These costs of changing prices are called **menu costs**—like the costs of printing up a new set of menus with different prices in a restaurant. Prices do respond to forces of supply and demand, but from a macroeconomic perspective, the process of changing all prices throughout the economy takes time.

To understand the effect of sticky wages and prices in the economy, consider Figure 1(a) illustrating the overall labor market, while Figure 1(b) illustrates a market for a specific good or service. The original equilibrium (E_0) in each market occurs at the intersection of the demand curve (D_0) and supply curve (S_0). When aggregate demand declines, the demand for labor shifts to the left (to D_1) in Figure 1(a) and the demand for goods shifts to the left (to D_1) in Figure 1(b). However, because of sticky wages and prices, the wage remains at its original level (W_0) for a period of time and the price remains at its original level (P_0).

As a result, a situation of excess supply—where the quantity supplied exceeds the quantity demanded at the existing wage or price—exists in markets for both labor and goods, and Q_1 is less than Q_0 in both Figure 1(a) and Figure 1(b). When many labor markets and many goods markets all across the economy find themselves in this position, the economy is in a recession; that is, firms cannot sell what they wish to produce at the existing market price and do not wish to hire all who are willing to work at the existing market wage.

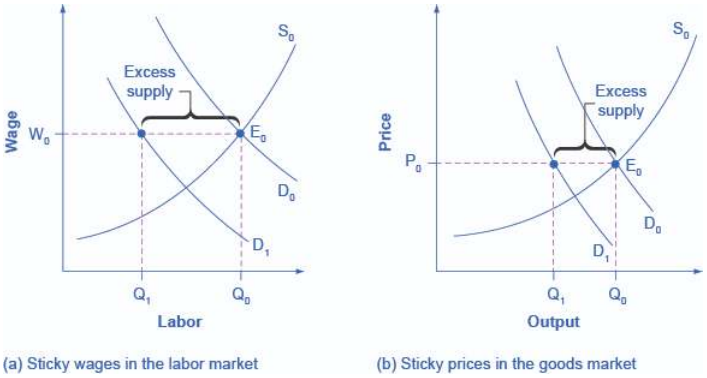


Figure 1. Sticky Prices and Falling Demand in the Labor and Goods Market. In both (a) and (b), demand shifts left from D_0 to D_1. However, the wage in (a) and the price in (b) do not immediately decline. In (a), the quantity demanded of labor at the original wage (W_0) is Q_0, but with the new demand curve for labor (D_1), it will be Q_1. Similarly, in (b), the quantity demanded of goods at the original price (P_0) is Q_0, but at the new demand curve (D_1) it will be Q_1. An excess supply of labor will exist, which is called unemployment. An excess supply of goods will also exist, where the quantity demanded is substantially less than the quantity supplied. Thus, sticky wages and sticky prices, combined with a drop in demand, bring about unemployment and recession.

WHY IS THE PACE OF WAGE ADJUSTMENTS SLOW?

The recovery after the Great Recession in the United States has been slow, with wages stagnant, if not declining. In fact, many low-wage workers at McDonalds, Dominos, and Walmart have threatened to strike for higher wages. Their plight is part of a larger trend in job growth and pay in the post–recession recovery.

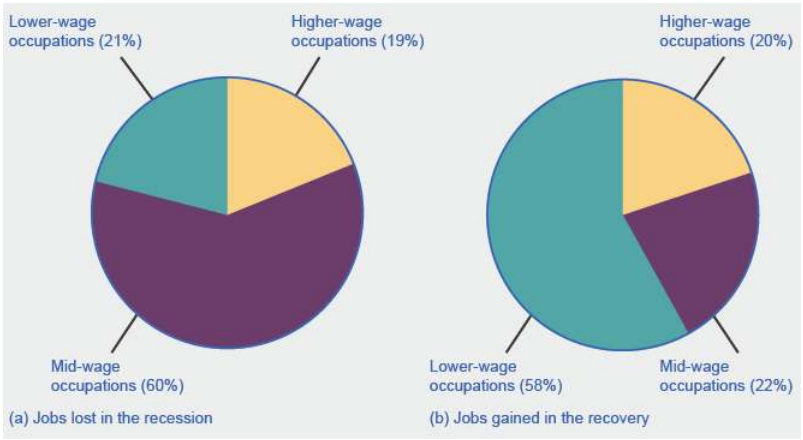


Figure 2. Jobs Lost/Gained in the Recession/Recovery. Data in the aftermath of the Great Recession suggests that jobs lost were in mid-wage occupations, while jobs gained were in low-wage occupations.

The National Employment Law Project compiled data from the Bureau of Labor Statistics and found that, during the Great Recession, 60% of job losses were in medium-wage occupations. Most of them were replaced during the recovery period with lower-wage jobs in the service, retail, and food industries. This data is illustrated in Figure 2.

Wages in the service, retail, and food industries are at or near minimum wage and tend to be both downwardly and upwardly "sticky." Wages are downwardly sticky due to minimum wage laws; they may be upwardly sticky if insufficient competition in low-skilled labor markets enables employers to avoid raising wages that would reduce their profits. At the same time, however, the Consumer Price Index increased 11% between 2007 and 2012, pushing real wages down.

The Two Keynesian Assumptions in the AS–AD Model

These two Keynesian assumptions—the importance of aggregate demand in causing recession and the stickiness of wages and prices—are illustrated by the AD–AS diagram in Figure 3. Note that because of the stickiness of wages and prices, the aggregate supply curve is flatter than either supply curve (labor or specific good). In fact, if wages and prices were so sticky that they did not fall at all, the aggregate supply curve would be completely flat below potential GDP, as shown in Figure 3. This outcome is an important example of a **macroeconomic externality,** where what happens at the macro level is different from the sum of what happens at the micro level.

The original equilibrium of this economy occurs where the aggregate demand function (AD_0) intersects with AS. Since this intersection occurs at potential GDP (Yp), the economy is operating at full employment. When aggregate demand shifts to the left, all the adjustment occurs through decreased real GDP. There is no decrease in the price level. Since the equilibrium occurs at Y_1, the economy experiences substantial unemployment.

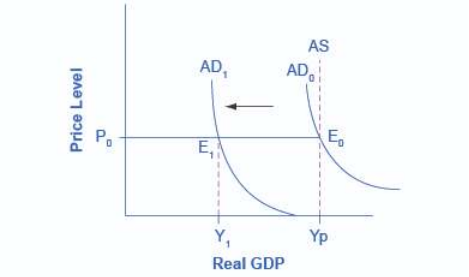


Figure 3. A Keynesian Perspective of Recession. The equilibrium (E_0) illustrates the two key assumptions behind Keynesian economics. The importance of aggregate demand is shown because this equilibrium is a recession which has occurred because aggregate demand is at AD_1 instead of AD_0. The importance of sticky wages and prices is shown because of the assumption of fixed wages and prices, which make the AS curve flat below potential GDP. Thus, when AD falls, the intersection E_1 occurs in the flat portion of the AS curve where the price level does not change.

Try It

https://assessments.lumenlearning.co...sessments/7536

Watch It

Watch the selected portion of this video to learn about the basic assumptions and recommendations of Keynesian analysis.

An interactive or media element has been excluded from this version of the text. You can view it online here: http://pb.libretexts.org/mlum/?p=389

Learning Objectives

[glossary-page][glossary-term]coordination argument: [/glossary-term]
[glossary-definition]downward wage and price flexibility requires perfect information about the level of lower compensation acceptable to other laborers and market participants[/glossary-definition]
[glossary-term]expenditure multiplier: [/glossary-term]
[glossary-definition]Keynesian concept that asserts that a change in autonomous spending causes a more than proportionate change in real GDP[/glossary-definition]
[glossary-term]macroeconomic externality: [/glossary-term]
[glossary-definition]occurs when what happens at the macro level is different from and inferior to what happens at the micro level; an example would be where upward sloping supply curves for firms become a flat aggregate supply curve, illustrating that the price level cannot fall to stimulate aggregate demand [/glossary-definition]
[glossary-term]menu costs: [/glossary-term]
[glossary-definition]costs firms face in changing prices[/glossary-definition]
[glossary-term]sticky wages and prices: [/glossary-term]
[glossary-definition]a situation where wages and prices do not fall in response to a decrease in demand, or do not rise in response to an increase in demand[/glossary-definition][/glossary-page]

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9.10: Introduction to Keynesian Policy Implications

What you'll learn to do: explain policy implications of Keynesian economics



By now, you know the basics of Keynesian economics and how it is connected to the AD-AS model. In this section, we will see how Keynesian economics plays out as government policies. You'll learn about the multiplier effect, the GDP gap, and Keynesian recommendations for reducing unemployment and inflation.

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9.11: The Expenditure Multiplier Effect

LEARNING OBJECTIVES

- Explain the expenditure multiplier effect
- Compute the size of the expenditure multiplier

The Expenditure Multiplier Effect

Keynesian economics has another important finding. You've learned that Keynesians believe that the level of economic activity is driven, in the short term, by changes in aggregate expenditure (or aggregate demand). Suppose that the macro equilibrium in an economy occurs at the potential GDP, so the economy is operating at full employment. Keynes pointed out that even though the economy *starts* at potential GDP, because aggregate demand tends to bounce around, it is unlikely that the economy will stay at potential. In 2007, U.S. investment expenditure collapsed with the fall of the housing market. As a result, the U.S. economy went into the Great Recession. But how much did GDP fall? Suppose investment fell by $100 billion. You might expect the result would be that GDP would fall by $100 billion too. If so, you would be wrong. It turns out that changes in any category of expenditure (Consumption + Investment + Government Expenditures + Exports-Imports) have a more than proportional impact on GDP. Or to say it differently, the change in GDP is a multiple of (say 3 times) the change in expenditure. This is the idea behind the multiplier.

The reason is that a change in aggregate expenditures circles through the economy: households buy from firms, firms pay workers and suppliers, workers and suppliers buy goods from other firms, those firms pay their workers and suppliers, and so on. In this way, the original change in aggregate expenditures is actually spent more than once. This is called the **expenditure multiplier** effect: an initial increase in spending, cycles repeatedly through the economy and has a larger impact than the initial dollar amount spent.

Watch It

Watch this video for a quick overview of the expenditure multiplier.

An interactive or media element has been excluded from this version of the text. You can view it online here: http://pb.libretexts.org/mlum/?p=393

How Does the Expenditure Multiplier Work?

It's easiest to see how the multiplier works with an increase in expenditure. Suppose government spontaneously purchase $100 billion worth of goods and services, perhaps because they feel optimistic about the future. The producers of those goods and services see an increase in income by that amount. They use that income to pay their bills, paying wages and salaries to their workers, rent to their landlords, payments for the raw materials they use. Any income left over is profit, which becomes income to their stockholders. Each of these economic agents takes their new income and spend some of it. Those purchases then become new income to the sellers, who then turn around and spend a portion of it. That spending becomes someone else's income. The process continues, though because economic agents spend only part of their income, the numbers get smaller in each round. When the dust settles the amount of new income generated is multiple times the initial increase in spending–hence, the name the spending multiplier. The table below gives an example of how this could work with an increase in government spending. Note that the multiplier works the same way in reverse with a decrease in spending.

Table 1. Calculating the Multiplier Effect

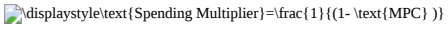
Original increase in aggregate expenditure from government spending	100
Save 10% of income. Spend 90% of income. Second-round increase of…	100 – 10 = 90
$90 of income to people through the economy: Save 10% of income. Spend 90% of income. Third-round increase of…	90 – 9 = 81
$81 of income to people through the economy: Save 10% of income. Spend 90% of income. Fourth-round increase of…	81 – 8.1 = 72.10

Table 1 works through the process of the multiplier. Over the first four rounds of aggregate expenditures, the impact of the original increase in government spending of $100 creates a rise in aggregate expenditures of $100 + $90 + $81 + $72.10 = $343.10, which is larger than the initial increase in spending. And the process isn't finished yet.

CALCULATING THE MULTIPLIER

Fortunately for everyone who is not carrying around a computer with a spreadsheet program to project the impact of an original increase in expenditures over 20, 50, or 100 rounds of spending, there is a formula for calculating the multiplier. The formula varies depending on how complex the version of the income-expenditure model is that you're using.

Let's look at the simplest case. The **marginal propensity to consume (MPC)** is the fraction of any change in income that is consumed and the **marginal propensity to save (MPS)** is the fraction of any change in income that is saved. We'll assume for simplicity that there are no income taxes, and that imports are a set amount. In this case, the formula is:

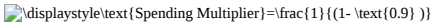


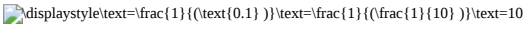
Since a consumer's only two options (in this example) are to spend income or to save it, MPC + MPS = 1, 1 – MPC = MPS. Thus, an equivalent form for the multiplier is:



Suppose the MPC = 90%; then the MPS = 10%

Therefore, the spending multiplier is:





In this simple case, a change in spending of $100 multiplied by the spending multiplier of 10 is equal to a change in GDP of $1,000.

Watch the selected clip from this video (stopping at 3:14) for more practice in solving for the spending multiplier.

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In the real world, the multiplier formula is more complex since economic agents have more options than just spending or saving. They have to pay taxes, and they can buy imports, both of which reduce the amount of money being multiplied. Thus, the spending multiplier is somewhat smaller than the one we've calculated here.

These other factors are known as "leakages," because they determine how much demand "leaks out" in each round of the multiplier effect. If the leakages are relatively small, then each successive round of the multiplier effect will have larger amounts of demand, and the multiplier will be high. Conversely, if the leakages are relatively large, then any initial change in demand will diminish more quickly in the second, third, and later rounds, and the multiplier will be small. Changes in the size of the leakages—a change in the marginal propensity to save, the tax rate, or the **marginal propensity to import**—will change the size of the multiplier. Thus, the spending multiplier in the real world is less than the multiplier derived in our simple example above.

The multiplier applies to any type of expenditure (e.g. C + I + G + X-M), and it applies when expenditure decreases as well as when it increases. Say that business confidence declines and investment falls off, or that the economy of a leading trading partner slows down so that export sales decline. These changes will reduce aggregate expenditures, and then will have an even larger effect on real GDP because of the multiplier effect.

Try It

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[ohm_question]153141[/ohm_question]

Glossary

[glossary-page][glossary-term]Expenditure (or Spending) Multiplier:[/glossary-term][glossary-definition]the ratio of the change in GDP to the change in aggregate expenditure which caused the change in GDP; the multiplier has a value greater than one[/glossary-definition][glossary-term]Marginal Propensity to Consume:[/glossary-term][glossary-definition]percentage of an increase (or decrease) in income which one spends (or reduces spending); also known as the MPC[/glossary-definition][glossary-term]Marginal Propensity to Import:[/glossary-term]
[glossary-definition]percentage of an increase (or decrease) in income which one spends (or reduces spending) on imported goods and services; also known as the MPI[/glossary-definition][glossary-term]Marginal Propensity to Save:[/glossary-term][glossary-definition]percentage of an increase (or decrease) in income which one saves (or reduces saving); also known as the MPS[/glossary-definition]
[/glossary-page]

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9.12: Keynesian Economic Policy

Learning Objectives

- Describe the GDP gap
- Explain the Keynesian logic for expansionary and contractionary fiscal policy for reducing unemployment and inflation

The GDP Gap

The GDP gap is defined as the difference between potential GDP and actual GDP, when both are measured in real terms. When the economy falls into recession, the GDP gap is positive, meaning the economy is operating at less than potential (and less than full employment). When the economy experiences an inflationary boom, the GDP gap is negative, meaning the economy is operating at greater than potential (and more than full employment).

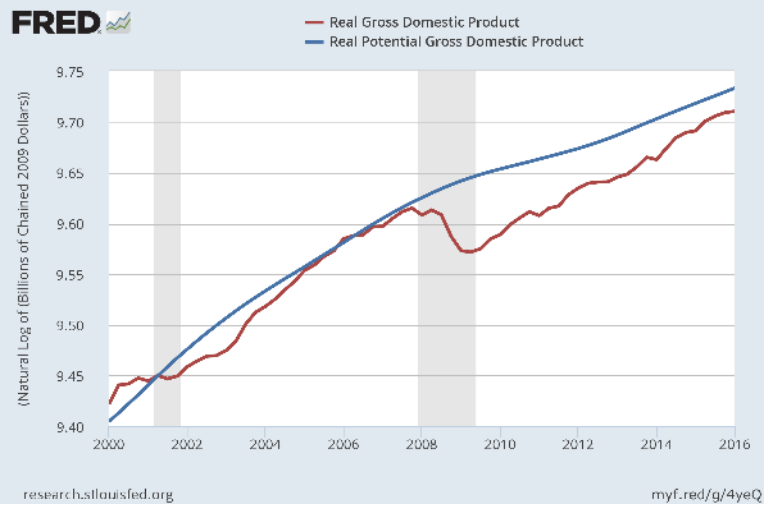


Figure 1. The GDP Gap. Potential (blue) and actual (red) GDP estimates from the Congressional Budget Office (CBO). The difference between the two lines is the GDP gap. The gray columns show areas of recession.

Since the neoclassical model assumes the economy operates at (exactly) full employment, the GDP Gap isn't really relevant to Neoclassical analysis but it is integral to the Keynesian view of the world, as we describe next.

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Keynesian Policy for Fighting Unemployment and Inflation

Keynesian economists argue that since the level of economic activity depends on aggregate demand, but that aggregate demand can't be counted on to stay at potential real GDP, the economy is likely to be characterized by recessions and inflationary booms. This cycle can be seen as fluctuations between positive and negative GDP gaps.

Keynesians believe that the solution to a recession is **expansionary fiscal policy,** such as tax cuts to stimulate consumption and investment, or direct increases in government spending, either of which would shift the aggregate demand curve to the right. For example, if aggregate demand was originally at ADr in Figure 2, so that the economy was in recession, the appropriate policy would be for government to shift aggregate demand to the right from ADr to ADf, where the economy would be at potential GDP and full employment.

Keynes noted that while it would be nice if the government could spend additional money on housing, roads, and other public goods, he also argued that if the government could not agree on how to spend money in practical ways, then it could spend in impractical ways. For example, Keynes suggested building monuments, like a modern equivalent of the Egyptian pyramids. He proposed that the government could bury money underground, and let mining companies get started to dig the money up again. While these suggestions were tongue-in-cheek, their purpose was to emphasize that a Great Depression is no time to quibble over

the specifics of government spending programs and tax cuts when the goal should be to pump up aggregate demand by enough to lift the economy to *potential GDP.*

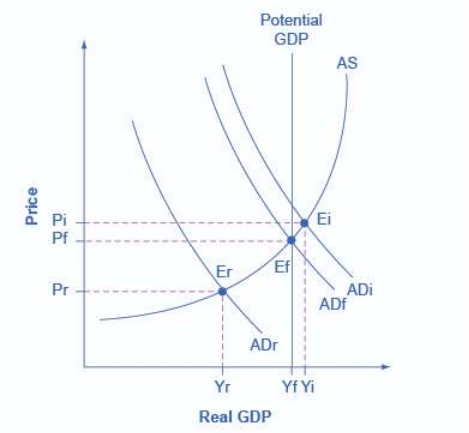


Figure 2. Fighting Recession and Inflation with Keynesian Policy. If an economy is in recession, with an equilibrium at Er, then the Keynesian response would be to enact a policy to shift aggregate demand to the right from ADr toward ADf. If an economy is experiencing inflationary pressures with an equilibrium at Ei, then the Keynesian response would be to enact a policy response to shift aggregate demand to the left, from ADi toward ADf.

The other side of Keynesian policy occurs when the economy is operating above potential GDP. In this situation, unemployment is low, but inflationary rises in the price level are a concern. The Keynesian response would be **contractionary fiscal policy,** using tax increases or government spending cuts to shift AD to the left. The result would be downward pressure on the price level, but very little reduction in output or very little rise in unemployment. If aggregate demand was originally at ADi in Figure 2, so that the economy was experiencing inflationary rises in the price level, the appropriate policy would be for government to shift aggregate demand to the left, from ADi toward ADf, which reduces the pressure for a higher price level while the economy remains at full employment.

In the Keynesian economic model, too little aggregate demand brings unemployment and too much brings inflation. Thus, you can think of Keynesian economics as pursuing a “Goldilocks” level of aggregate demand: not too much, not too little, but looking for what is just right.

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The Keynesian Perspective on Market Forces

Ever since the birth of Keynesian economics in the 1930s, controversy has simmered over the extent to which government should play an active role in managing the economy. In the aftermath of the human devastation and misery of the Great Depression, many people—including many economists—became more aware of vulnerabilities within the market-oriented economic system.

However, Keynes himself was careful to separate the issue of aggregate demand from the issue of how well individual markets worked. He argued that individual markets for goods and services were appropriate and useful, but that sometimes that level of aggregate demand was just too low. When 10 million people are willing and able to work, but one million of them are unemployed, he argued, individual markets may be doing a perfectly good job of allocating the efforts of the nine million workers—the problem is that insufficient aggregate demand exists to support jobs for all 10 million. Thus, he believed that, while government should ensure that overall level of aggregate demand is sufficient for an economy to reach full employment, this task did not imply that the government should attempt to set prices and wages throughout the economy, nor to take over and manage large corporations or entire industries directly.

The Keynesian approach, with its focus on aggregate demand and sticky prices, has proved useful in understanding how the economy fluctuates in the short run and why recessions and cyclical unemployment occur. Later, will we cover a different viewpoint—the neoclassical perspective—and will consider some of the shortcomings of the Keynesian approach and why it is not especially well-suited for long-run macroeconomic analysis.

THE GREAT RECESSION

The lessons learned during the Great Depression of the 1930s and the aggregate expenditure model proposed by John Maynard Keynes gave the modern economists and policymakers of today the tools to effectively navigate the treacherous economy in the latter half of the 2000s. In "How the Great Recession Was Brought to an End," Alan S. Blinder and Mark Zandi wrote that the actions taken by today's policymakers stand in sharp contrast to those of the early years of the Great Depression. Today's economists and policymakers were not content to let the markets recover from recession without taking proactive measures to support consumption and investment. The Federal Reserve actively lowered short-term interest rates and developed innovative ways to pump money into the economy so that credit and investment would not dry up. Both Presidents Bush and Obama (along with Congress) implemented a variety of programs ranging from tax rebates to "Cash for Clunkers" to the Troubled Asset Relief Program to stimulate and stabilize household consumption and encourage investment. Although these policies came under harsh criticism from the public and many politicians, they lessened the impact of the economic downturn and may have saved the country from a second Great Depression.

Try It

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[ohm_question]153122[/ohm_question]

Glossary

[glossary-page][glossary-term]contractionary fiscal policy: [/glossary-term][glossary-definition]efforts to decrease aggregate demand through tax increases or government spending cuts[/glossary-definition]
[glossary-term]expansionary fiscal policy:[/glossary-term][glossary-definition] efforts to increase aggregate demand through means such as tax cuts to stimulate consumption and investment, or direct increases in government spending[/glossary-definition]
[glossary-term]GDP gap: [/glossary-term][glossary-definition]The difference between actual and potential real GDP; during recessions the gap grows; during booms the gap becomes negative[/glossary-definition][/glossary-page]

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9.13: Introduction to Neoclassical Economics

What you'll learn to do: understand the tenets of neoclassical economics



By the end of the 1960s, Keynesian economics was a high point. President Richard Nixon, a Republican, is said to have stated, "We are all Keynesians now!" Macro economists felt they understood all they needed to know about the macro economy. Then came the recession of 1974-75. Keynesian economics argued that recessions are caused by decreases in aggregate demand, but there was no such decrease prior to that recession. What had happened?

The inability of Keynesians to answer that question resulted in a paradigm shift in macroeconomics, in which Keynesian economics lost prestige, and neoclassical economics enjoyed a resurgence. The neoclassical response to the 1974-75 recession was that the oil crisis represented a negative supply shock. As research in neoclassical thought became popular, a variety of neoclassical "flavors" became known, including supply side economics (i.e. Reaganomics) and New Classical economics. We will explore these in more depth in subsequent modules.

In this section, we will explore the neoclassical perspective on economics and then compare it to the Keynesian perspective. We will continue to utilize the aggregate demand/aggregate supply model as we learn more about the neoclassical perspective. We will see that for many economists, the question is not which perspective is correct, but rather under what circumstances each model makes the most sense.

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9.14: The Neoclassical Perspective

Learning Objectives

- Describe the basic tenets of the neoclassical perspective
- Explain Say's Law

What is Neoclassical Economics?

In the previous section, we learned about the Keynesian view of macroeconomics. Now we'll explore the neoclassical perspective. What is neoclassical economics? We described Keynesian economics in terms of a positive characteristic: that the macro economy is inherently unstable, and in terms of a normative characteristic: that since the private economy can't be counted on to keep the economy at potential GDP and full employment, government has a responsibility to step in to do so.

Neoclassical economics can also be defined in terms of two characteristics, one positive and one normative: that the macroeconomy is inherently stable, i.e., that any divergences from potential GDP and full employment are temporary; and that government should take a laissez-faire, or hands-off, perspective and should not attempt to actively manage the macro economy. There are a number of schools of thought that can be included under the Neoclassical perspective. These include traditional classical economics, monetarist economics, supply-side economics (or Reaganomics), and more. Each of these views have the two characteristics we described for Neoclassical economics above. As we discuss specific issues over the rest of the modules, we will mention specific positions of different neoclassical views, but for now it is probably more important to focus on their similarities.

Say's Law and the Neoclassical Perspective

As the name "neoclassical" implies, this perspective of how the macroeconomy works is a "new" view of the "old" classical model of the economy. The **classical** view, the predominant economic philosophy until the Great Depression, was that short-term fluctuations in economic activity would rather quickly, with flexible prices, adjust back to full employment.



Figure 1. Say's Law emphasizes the role of supply in creating demand. If a car company employs people and resources to make cars, then this will generate income and in turn, create demand for the cars.

Say's Law is a good explanation of the logic behind classical (and neoclassical) economics. Jean-Baptiste Say (1767–1832) was a French economist of the early nineteenth century. **Say's law** is: "Supply creates its own demand."

The intuition behind Say's law is that each time a good or service is produced and sold, it generates income that is earned for someone: a worker, a manager, an owner, or those who are workers, managers, and owners at firms that supply inputs along the chain of production. The forces of supply and demand in individual markets will cause prices to rise and fall. The bottom line remains, however, that every sale represents income to someone, and so, Say's law argues, a given value of supply must create an equivalent value of demand somewhere else in the economy. Because Jean-Baptiste Say, Adam Smith, and other economists writing around the turn of the nineteenth century who discussed this view were known as "classical" economists, modern economists who generally subscribe to the Say's law view on the importance of supply for determining the size of the macroeconomy are called **neoclassical economists**.

If supply always creates exactly enough demand at the macroeconomic level, then (as Say himself recognized) it is hard to understand why periods of recession and high unemployment should ever occur. To be sure, even if total supply always creates an

equal amount of total demand, the economy could still experience a situation of some firms earning profits while other firms suffer losses. Nevertheless, a recession is not a situation where all business failures are exactly counterbalanced by an offsetting number of successes. A recession is a situation in which the economy as a whole is shrinking in size, business failures outnumber the remaining success stories, and many firms end up suffering losses and laying off workers.

Say's law that supply creates its own demand does seem a good approximation for the long run. Over periods of some years or decades, as the productive power of an economy to supply goods and services increases, total demand in the economy grows at roughly the same pace. However, over shorter time horizons of a few months or even years, recessions or even depressions occur in which firms, as a group, seem to face a lack of demand for their products.

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The Big Picture and The Neoclassical Perspective

In Chicago, Illinois, the highest recorded temperature was 105° in July 1995, while the lowest recorded temperature was 27° below zero in January 1958. Understanding why these extreme weather patterns occurred would be interesting. However, if you wanted to understand the typical weather pattern in Chicago, instead of focusing on one-time extremes, you would need to look at the entire pattern of data over time.

A similar lesson applies to the study of macroeconomics. It is interesting to study extreme situations, like the *Great Depression* of the 1930s or what many have called the *Great Recession* of 2008–2009. If you want to understand the whole picture, however, you need to look at the long term. If you want to understand why the number of people globally who live on $1 a day or less has declined by more than three quarters over the last 50 years, or why the average standard of living in the U.S. has quadrupled over the last 100 years, the neoclassical perspective is the way to go.

Link to LEarning

We won't spent time diving into all of the individual economic schools of thoughts, but if you are interested in learning more about the development of some of the more popular theories, you can watch this CrashCourse video for an overview about some other perspectives like the Austrians, the Chicago school, and the monetarists.

Glossary

[glossary-page]
[glossary-term]Classical economics:[/glossary-term]
[glossary-definition]earliest of a number of neoclassical perspectives.[/glossary-definition]

[glossary-term]Neoclassical economics:[/glossary-term]
[glossary-definition]any of a number of economic perspectives that believes that the macro economy is inherently stable and that government should not attempt to manage the economy.[/glossary-definition]

[glossary-term]Say's Law:[/glossary-term]
[glossary-definition] fundamental belief of classical economics that supply creates its own demand[/glossary-definition]
[/glossary-page]

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9.15: The Neoclassical Perspective and Potential GDP

Learning Objectives

- Explain the importance of potential GDP in the long run to the neoclassical perspective
- Explain the shape and reasoning for the pure neoclassical aggregate supply curve

The **neoclassical perspective** on macroeconomics is based on two building blocks (or assumptions):

1. Since in the long run, the economy will fluctuate around its potential GDP and its natural rate of unemployment, the size of the economy is determined by potential GDP.
2. wages and prices will adjust in a flexible manner so that disturbances such as recessions will be temporary and the economy will always return to its potential level of output on its own.

The key policy implication is this: government should focus more on promoting long-term economic growth and on controlling inflation rather than worrying about recession or cyclical unemployment. This focus on long-run growth instead of short-run fluctuations in the business cycle means that neoclassical economics is more useful for long-run macroeconomic analysis and Keynesian economics is more useful for analyzing the macroeconomic short run. Let's consider the two neoclassical building blocks in turn, and how they can be embodied in the aggregate demand-aggregate supply model.

The Importance of Potential GDP in the Long Run

When economists refer to **potential GDP**, they are referring to that level of output that can be achieved when all resources (land, labor, capital, and entrepreneurial ability) are fully employed. While the measured unemployment rate in labor markets will never be zero, full employment in the labor market occurs when there is no cyclical unemployment. There will still be some frictional or structural unemployment, but when the economy is operating with zero cyclical unemployment, the economy is said to be at the natural rate of unemployment, or at full employment.

Figure 1 shows potential and actual real GDP from 1960 to 2017 (the data for potential GDP is estimated by the nonpartisan Congressional Budget Office, while the data for real GDP is from the Bureau of Economic Analysis in the U.S. Department of Commerce). What should be clear is that while actual GDP is sometimes above and sometimes below potential, over the long term it tracks potential quite well. For example from 2008 to 2009, the U.S. economy tumbled into recession and remained below its potential. At other times, like in the late 1990s or late 2017, the economy ran at potential GDP—or even slightly ahead. Most economic recessions and upswings are times when the economy is 1–3% below or above potential GDP in a given year. Clearly, short-run fluctuations around potential GDP do exist, but over the long run, the upward trend of potential GDP determines the size of the economy.

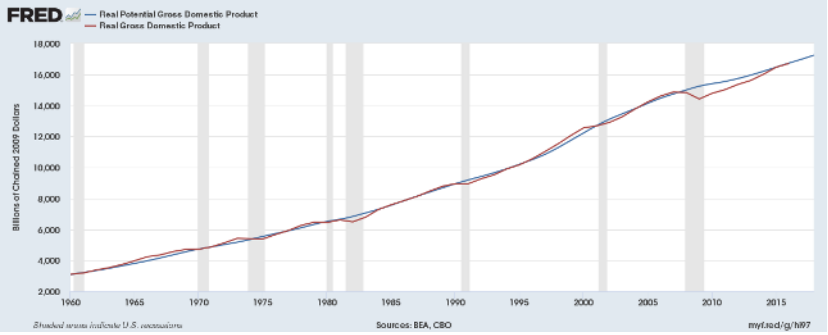


Figure 1. Potential and Actual GDP (in Real Dollars). Actual GDP falls below potential GDP during and after recessions, like the recessions of 1980 and 1981–82, 1990–91, 2001, and 2008–2009. In other periods, actual GDP can be above potential GDP for a time, as in the late 1990s.

The unemployment rate has fluctuated from as low as 3.5% in 1969 to as high as 9.7% in 1982 and 9.6% in 2009. Even as the U.S. unemployment rate rose during recessions and declined during expansions, it kept returning to the general neighborhood of 5.0–5.5%. When the Congressional Budget Office carried out its long-range economic forecasts in 2010, it assumed that from 2015 to 2020, after the recession has passed, the unemployment rate would be 5.0%. From a long-run perspective, the economy seems to keep adjusting back to this rate of unemployment, which we described above as the **natural rate**.

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Growth of Real GDP

Growth in GDP can be explained by investment in physical capital and human capital per person, as well as advances in technology. **Physical capital per person** refers to the amount and kind of machinery and equipment available to help people get work done. Compare, for example, your productivity in typing a term paper on a typewriter to working on your laptop with word processing software. Clearly, you will be able to be more productive using word processing software. The technology and level of capital of your laptop and software has increased your productivity. More broadly, the development of GPS technology and Universal Product Codes (those barcodes on every product we buy) has made it much easier for firms to track

shipments, tabulate inventories, and sell and distribute products. These two technological innovations, and many others, have increased a nation's ability to produce goods and services for a given population. Likewise, increasing human capital involves increasing levels of knowledge, education, and skill sets per person through vocational or higher education. Physical and human capital improvements with technological advances will increase overall productivity and, thus, GDP.

To see how these improvements have increased productivity and output at the national level, we should examine evidence from the United States. The United States experienced significant growth in the twentieth century due to phenomenal changes in infrastructure, equipment, and technological improvements in physical capital and human capital. The population more than tripled in the twentieth century, from 76 million in 1900 to over 300 million in 2012. The **human capital** of modern workers is far higher today because the education and skills of workers have risen dramatically. In 1900, only about one-eighth of the U.S. population had completed high school and just one person in 40 had completed a four-year college degree. By 2010, more than 87% of Americans had a high school degree and over 29% had a four-year college degree as well. The average amount of physical capital per worker has grown dramatically. The technology available to modern workers is extraordinarily better than a century ago: cars, airplanes, electrical machinery, smartphones, computers, chemical and biological advances, materials science, health care—the list of technological advances could run on and on. More workers, higher skill levels, larger amounts of physical capital per worker, and amazingly better technology, and potential GDP for the U.S. economy has clearly increased a great deal since 1900.

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The Neoclassical Aggregate Supply Curve

In the aggregate demand-aggregate supply model, potential GDP is shown as a vertical line. Neoclassical economists argue that the long-run aggregate supply curve is located at potential GDP—that is, the long-run aggregate supply curve is a vertical line drawn at the level of potential GDP, as shown in Figure 2. A vertical LRAS curve means that the level of aggregate supply (or potential GDP) will determine the real GDP of the economy, regardless of the level of aggregate demand. More precisely, given flexible prices, whatever the position of the AD curve, prices will adjust so that AD = AS at potential GDP.

Over time, increases in the quantity and quality of physical capital, increases in human capital, and technological advancements shift potential GDP and the vertical LRAS curve gradually to the right. This gradual increase in an economy's potential GDP is often described as a nation's long-term economic growth.

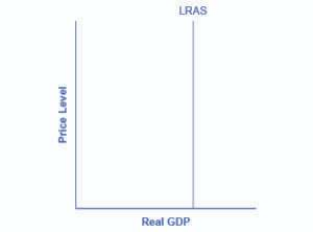


Figure 2. A Pure Neoclassical AS Curve. In the neoclassical model, the aggregate supply curve is drawn as a vertical line at the level of potential GDP. If AS is vertical, then it determines the level of real output, no matter where the aggregate demand curve is drawn. Over time, the LRAS curve shifts to the right as productivity increases and potential GDP expands.

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9.16: Learn By Doing- The Neoclassical Perspective and Potential GDP

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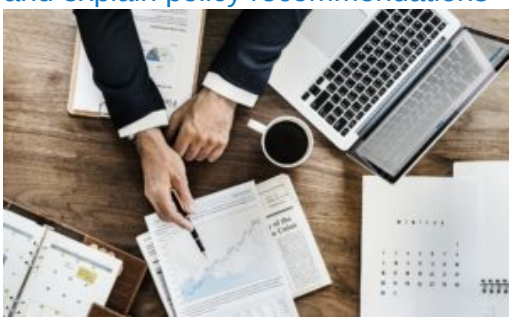
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9.17: Introduction to the Neoclassical Perspective and the AD-AS Model

What you'll learn to do: describe how the neoclassical model responds to fluctuations in the economy and explain policy recommendations



Now that you have a basic understanding of the neoclassical model, in this section we will take a deeper look into how to graph this model, and how the model will respond to fluctuations in the economy. We'll also analyze what policy recommendations neoclassical economists would give in order to boost GDP or fix a recession.

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9.18: Flexible Prices and Graphing in the Neoclassical Model

Learning Objectives

- Analyze the role of flexible prices in the neoclassical model
- Describe and show how the AD-AS curve fluctuates according to the neoclassical model

The Role of Flexible Prices

How does the macroeconomy adjust back to its level of potential GDP in the long run? What if aggregate demand increases or decreases? The neoclassical view of how the macroeconomy adjusts is based on the insight that even if wages and prices are "sticky", or slow to change, in the short run, they are flexible over time. To understand this better, let's follow the connections from the short-run to the long-run macroeconomic equilibrium.

The aggregate demand and aggregate supply diagram shown in the interactive graph below (Figure 1) shows two aggregate supply curves. The original upward sloping aggregate supply curve (AS_0) is a short-run or Keynesian AS curve. The vertical aggregate supply curve (ASn) is the long-run or neoclassical AS curve, which is located at potential GDP. The original aggregate demand curve, labeled AD_0, is drawn so that the original equilibrium occurs at point E_0, at which point the economy is producing at its potential GDP.

Now, imagine that some economic event boosts aggregate demand: perhaps a surge of export sales or a rise in business confidence that leads to more investment, perhaps a policy decision like higher government spending, or perhaps a tax cut that leads to additional aggregate demand. The short-run Keynesian analysis is that the rise in aggregate demand will shift the aggregate demand curve out to the right, from AD_0 to AD_1, leading to a new equilibrium at point E_1 with higher output, lower unemployment, and pressure for an inflationary rise in the price level.

An interactive or media element has been excluded from this version of the text. You can view it online here: http://pb.libretexts.org/mlum/?p=407

Figure 1 (Interactive Graph). The Rebound to Potential GDP after AD Increases.

In the long-run neoclassical analysis, however, the chain of economic events is just beginning. As economic output rises above potential GDP, the level of unemployment falls. The economy is now above full employment and there is a shortage of labor. Eager employers are trying to bid workers away from other companies and to encourage their current workers to exert more effort and to put in longer hours. This high demand for labor will drive up wages. Most workers have their salaries reviewed only once or twice a year, and so it will take time before the higher wages filter through the economy. As wages do rise, it will mean a leftward shift in the short-run Keynesian aggregate supply curve back to AS_1, because the price of a major input to production has increased. The economy moves to a new equilibrium (E_2). The new equilibrium has the same level of real GDP as did the original equilibrium (E_0), but there has been an inflationary increase in the price level.

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This description of the short-run shift from E_0 to E_1 and the long-run shift from E_1 to E_2 is a step-by-step way of making a simple point: the economy cannot sustain production above its potential GDP in the long run. An economy may produce above its level of potential GDP in the short run, under pressure from a surge in aggregate demand. Over the long run, however, that surge in aggregate demand ends up as an increase in the price level, not as a rise in output.

The rebound of the economy back to potential GDP also works in response to a shift to the left in aggregate demand. The interactive graph below (Figure 2) again starts with two aggregate supply curves, with AS_0 showing the original upward sloping short-run Keynesian AS curve and ASn showing the vertical long-run neoclassical aggregate supply curve. A decrease in aggregate demand—for example, because of a decline in consumer confidence that leads to less consumption and more saving—causes the original aggregate demand curve AD_0 to shift back to AD_1. The shift from the original equilibrium (E_0) to the new equilibrium (E_1) results in a decline in output. The economy is now below full employment and there is a surplus of labor. As output falls below potential GDP, unemployment rises. While a lower price level (i.e., deflation) is rare in the United States, it does happen from time

to time during very weak periods of economic activity. For practical purposes, we might consider a lower price level in the AD–AS model as indicative of disinflation, which is a decline in the rate of inflation. Thus, the long-run aggregate supply curve ASn, which is vertical at the level of potential GDP, ultimately determines the real GDP of this economy.

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Figure 2 (Interactive Graph). A Rebound Back to Potential GDP from a Shift to the Left in Aggregate Demand.

Again, from the neoclassical perspective, this short-run scenario is only the beginning of the chain of events. The higher level of unemployment means more workers looking for jobs. As a result, employers can hold down on pay increases—or perhaps even replace some of their higher-paid workers with unemployed people willing to accept a lower wage. As wages stagnate or fall, this decline in the price of a key input means that the short-run Keynesian aggregate supply curve shifts to the right from its original (AS_0 to AS_1). The overall impact in the long run, as the macroeconomic equilibrium shifts from E_0 to E_1 to E_2, is that the level of output returns to potential GDP, where it started. There is, however, downward pressure on the price level. Thus, in the neoclassical view, changes in aggregate demand can have a short-run impact on output and on unemployment—but only a short-run impact. In the long run, when wages and prices are flexible, potential GDP and aggregate supply determine the size of real GDP.

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Watch It

This video uses the AD-AS model to present the neoclassical perspective of the effects of changes in aggregate demand on real GDP and employment. On the graph, you can see that a decrease in aggregate demand leads to a recession. Over time, though, wages will fall, shifting aggregate supply to the right, bringing prices down as well. This process continues until equilibrium returns to the LRAS line, with full employment. Similarly, an increase in aggregate demand leads to an inflationary gap, causing wages to increase over time until the aggregate supply curve shifts to the left, raising prices and returning equilibrium to LRAS and full employment.

In both cases, aggregate demand changes have no long run effect on real GDP or employment, but only on wages and prices. This is what neoclassicals believe.

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9.20: Speed of Macroeconomic Adjustment

Learning Objectives

- Explain how the neoclassical ideas of rational expectations and adaptive expectations may contribute to a faster speed of macroeconomic adjustment

Speed of Macroeconomic Adjustment

How long does it take for wages and prices to adjust, and for the economy to rebound back to its potential GDP? This subject is highly contentious. Keynesian economists argue that if the adjustment from recession to potential GDP takes a very long time, then neoclassical theory may be more hypothetical than practical. In response to those immortal words of John Maynard Keynes, "In the long run we are all dead," (implying it is impractical to wait for the economy to fix itself) neoclassical economists would say that even if the adjustment takes as long as ten years, the neoclassical perspective remains of central importance in understanding the economy.

One subset of neoclassical economists holds that the adjustment of wages and prices in the macroeconomy might be quite rapid indeed. The theory of **rational expectations** holds that people form the most accurate possible expectations about the future that they can, using all information available to them. In an economy where most people have rational expectations, economic adjustments may happen very quickly.



Figure 1. Gentrification, when more affluent residents move into older neighborhoods, causes a change in expectations about an area, leading to higher home prices.

To understand how rational expectations may affect the speed of price adjustments, let's consider a situation in the real estate market. Imagine that several events seem likely to push up the value of homes in the neighborhood. Perhaps a local employer announces that it is going to hire many more people or the city announces that it is going to build a local park or a library in that neighborhood. The theory of rational expectations points out that even though none of the changes will happen immediately, home prices in the neighborhood will rise immediately, because the expectation that homes will be worth more in the future will lead buyers to be willing to pay more in the present. The amount of the immediate increase in home prices will depend on how likely it seems that the announcements about the future will actually happen and on how distant the local jobs and neighborhood improvements are in the future. The key point is that, because of rational expectations, prices do not wait on events, but adjust immediately.

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At a macroeconomic level, the theory of rational expectations points out that if the aggregate supply curve is vertical over time, then people should rationally expect this pattern. When a shift in aggregate demand occurs, people and businesses with rational expectations will know that its impact on output and employment will be temporary, while its impact on the price level will be permanent. If firms and workers perceive the outcome of the process in advance, and if all firms and workers know that everyone else is perceiving the process in the same way, then they have no incentive to go through an extended series of short-run scenarios, like a firm first hiring more people when aggregate demand shifts out and then firing those same people when aggregate supply

shifts back. Instead, everyone will recognize where this process is heading—toward a change in the price level—and then will act on that expectation. In this scenario, the expected long-run change in the price level may happen very quickly, without a drawn-out zigzag of output and employment first moving one way and then the other. If firms and workers held rational expectations, then changes made by monetary and fiscal policy would ineffective and needless.

The theory that people and firms have rational expectations can be a useful simplification, but as a statement about how people and businesses actually behave, the assumption seems too strong. After all, many people and firms are not especially well informed, either about what is happening in the economy or about how the economy works. It is probably more realistic to believe that people and firms act with **adaptive expectations***;* they look at past experience and gradually adapt their beliefs and behavior as circumstances change, but are not perfect synthesizers of information and accurate predictors of the future in the sense of rational expectations theory. If most people and businesses have some form of adaptive expectations, then the adjustment from the short run and long run will be traced out in incremental steps that occur over time.

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The empirical evidence on the speed of macroeconomic adjustment of prices and wages is not clear-cut. Indeed, the speed of macroeconomic adjustment probably varies among different countries and time periods. A reasonable guess is that the initial short-run effect of a shift in aggregate demand might last two to five years, before the adjustments in wages and prices cause the economy to adjust back to potential GDP. Thus, one might think of the short run for applying Keynesian analysis as time periods less than two to five years, and the long run for applying neoclassical analysis as longer than five years. For practical purposes, this guideline is frustratingly imprecise, but when analyzing a complex social mechanism like an economy as it evolves over time, some imprecision seems unavoidable.

Glossary

[glossary-page][glossary-term]adaptive expectations:[/glossary-term]
[glossary-definition]the theory that people look at past experience and gradually adapt their beliefs and behavior as circumstances change[/glossary-definition][glossary-term]rational expectations:[/glossary-term]
[glossary-definition]the theory that people form the most accurate possible expectations about the future that they can, using all information available to them[/glossary-definition][/glossary-page]

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9.21: Policy Implications of the Neoclassical Perspective

Learning Objectives

- Describe the policy prescriptions of neoclassical economics

When Should the Government Correct the Economy?



Figure 1. While the Keynesian perspective argues that government should step in to stabilize the economy in a recession, many neoclassical economists hold that intervention is often too late and ineffective. They argue that it would be better to address the flawed policies that led to the recession in the first place.

To understand the policy recommendations of the neoclassical economists, it helps to start with the Keynesian perspective. Suppose a decrease in aggregate demand causes the economy to go into recession with high unemployment. The Keynesian response would be to use government policy to stimulate aggregate demand and eliminate the recessionary gap. The neoclassical economists believe that the Keynesian response, while perhaps well intentioned, will not have a good outcome. Since the neoclassical economists believe that the economy will correct itself over time, the only advantage of a Keynesian stabilization policy would be to accelerate the process and minimize the time that the unemployed are out of work. Is that the likely outcome?

Keynesian macroeconomic policy requires some optimism about the government's ability to recognize a situation of too little or too much aggregate demand, and to adjust aggregate demand accordingly with the right level of changes in taxes or spending, all enacted in a timely fashion. After all, neoclassical economists argue, it takes government statisticians months to produce even preliminary estimates of GDP so that politicians know whether a recession is occurring—and those preliminary estimates may be revised substantially later. Moreover, there is the question of timely action. The political process can take more months to enact a tax cut or a spending increase. Political or economic considerations may determine the amount of tax or spending changes. Then the economy will take still more months to put into effect changes in aggregate demand through spending and production.

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When economists and policy makers consider all of these time lags and political realities, active fiscal policy may fail to address the current problem, and could even make the future economy worse. The average U.S. post-World War II recession has lasted only about a year. By the time government policy activates, the recession will likely be over. As a consequence, the only result of government fine-tuning will be to stimulate the economy when it is already recovering (or to contract the economy when it is already falling). In other words, an active macroeconomic policy is likely to exacerbate the cycles rather than dampen them. Some neoclassical economists believe a large part of the business cycles we observe are due to flawed government policy.

Policy Prescriptions of the Neoclassical Perspective

The policy prescriptions of neoclassical economics are very simple. Because of flexible prices and wages, any divergence from potential output and full employment is self-correcting. Thus, there is no need for government intervention in the macroeconomy.

Indeed, as we will learn in subsequent modules, government intervention is unlikely to help and more likely to hurt the functioning of the economy.

In short, neoclassical economists do not believe in “fine-tuning” the economy. They believe that economic growth is fostered by a stable economic environment with a low rate of inflation. Similarly, tax rates should be low and unchanging. In this environment, private economic agents can make the best possible investment decisions, which will lead to optimal investment in physical and human capital as well as research and development to promote improvements in technology.

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9.22: Introduction to Comparing the Keynesian and Neoclassical Perspectives

What you'll learn to do: compare and contrast the Keynesian and Neoclassical perspectives



Macroeconomists over the last two centuries have often divided into two groups: those who argue that supply is the most important determinant of the size of the macroeconomy while demand just tags along, and those who argue that demand is the most important factor in the size of the macroeconomy while supply just tags along.

As you now know, neoclassical economists emphasize Say's law, which holds that supply creates its own demand. Conversely, Keynesian economists emphasize Keynes' law, which holds that demand creates its own supply. Many mainstream economists take a Keynesian perspective, emphasizing the importance of aggregate demand, for the short run, and a neoclassical perspective, emphasizing the importance of aggregate supply, for the long run. In this section, you'll see how these various approaches apply to various situations, particularly differing in the short term and the long term.

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9.23: Say's Law versus Keynes' Law

Learning Objectives

- Differentiate between the ways that Say's Law and Keynes' Law explain economic behavior

Macroeconomists over the last two centuries have often divided into two groups: those who argue that supply is the most important determinant of the size of the macroeconomy while demand just tags along, and those who argue that demand is the most important factor in the size of the macroeconomy while supply just tags along.

Say's Law and the Macroeconomics of Supply



Figure 1. Say's law emphasizes the importance of production and supply.

Those neoclassical economists who emphasize the role of supply in the macroeconomy often refer to Say's law: supply creates its own demand. As a matter of historical accuracy, it seems clear that Say never actually wrote down this law and that it oversimplifies his beliefs, but the law lives on as useful shorthand for summarizing a point of view.

The reasoning behind Say's law is that each time output is produced and sold, the revenues represent an equivalent amount of income generated. This income allows the owners to purchase the amount of output that was produced. While widget workers may not want to spend their entire paycheck on widgets, they will want to buy *something*, if not what they produced then something some other workers produced. In the aggregate, supply creates its own demand, or more generally, aggregate supply drives the economy while aggregate demand responds passively.

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Keynes' Law and the Macroeconomics of Demand

The alternative to Say's law, with its emphasis on supply, can be named **Keynes' Law**: "Demand creates its own supply." As a matter of historical accuracy, just as Jean-Baptiste Say never wrote down anything as simpleminded as Say's law, John Maynard Keynes never wrote down Keynes' law, but the law is a useful simplification that conveys a certain point of view.



Figure 2. Keynes' Law emphasizes the role of demand.

When Keynes wrote his great work *The General Theory of Employment, Interest, and Money* during the *Great Depression* the 1930s, he pointed out that during the Depression, the capacity of the economy to supply goods and services had not changed much. U.S. unemployment rates soared higher than 20% from 1933 to 1935, but the number of possible workers had not increased or decreased much. Factories were closed and shuttered, but machinery and equipment had not disappeared. Technologies that had been invented in the 1920s were not un-invented and forgotten in the 1930s. Thus, Keynes argued that the Great Depression—and many ordinary recessions as well—were not caused by a drop in the ability of the economy to supply goods as measured by labor, physical capital, or technology. He argued the economy often produced less than its full potential, not because it was technically impossible to produce more with the existing workers and machines, but because a lack of demand in the economy as a whole led to inadequate incentives for firms to produce. In such cases, he argued, the level of GDP in the economy was not primarily determined by the potential of what the economy could supply, but rather by the amount of total demand.

Keynes' law seems to apply fairly well in the short run of a few months to a few years, when many firms experience either a drop in demand for their output during a recession or so much demand that they have trouble producing enough during an economic boom. However, demand cannot tell the whole macroeconomic story, either. After all, if demand was all that mattered at the macroeconomic level, then the government could make the economy as large as it wanted just by pumping up total demand through a large increase in the government spending component or by legislating large tax cuts to push up the consumption component. Economies do, however, face genuine limits to how much they can produce, limits determined by the quantity of labor, physical capital, technology, and the institutional and market structures that bring these factors of production together. These constraints on what an economy can supply at the macroeconomic level do not disappear just because of an increase in demand.

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Combining Supply and Demand in Macroeconomics

Two insights emerge from this overview of Say's law with its emphasis on macroeconomic supply and Keynes' law with its emphasis on macroeconomic demand. The first conclusion, which is not exactly a hot news flash, is that an economic approach focused only on the supply side or only on the demand side can be only a partial success. Both supply and demand need to be taken into account. The second conclusion is that since Keynes' law applies more accurately in the short run and Say's law applies more accurately in the long run, the tradeoffs and connections between the three goals of macroeconomics may be different in the short run and the long run.

Table 1 summarizes the two macroeconomic perspectives.

Table 1. Comparing Neoclassical and Keynesian Economics		
Summary	Neoclassical Economics	Keynesian Economics
Focus: long-term or short term	Long-term	Short-term
Prices and wages: sticky or flexible?	Flexible	Sticky
Economic output: Primarily determined by aggregate demand or aggregate supply?	Aggregate supply	Aggregate demand
Aggregate supply: vertical or upward-sloping?	Vertical	Upward-sloping
Phillips curve vertical or downward-sloping	Vertical	Downward sloping
Is aggregate demand a useful tool for controlling inflation?	Yes	Yes
What should be the primary area of policy emphasis for reducing unemployment?	Reform labor market institutions to reduce natural rate of unemployment	Increase aggregate demand to eliminate cyclical unemployment
Is aggregate demand a useful tool for ending recession?	At best, only in the short-run temporary sense, but may just increase inflation instead	Yes

GLOSSARY

[glossary-page]
[glossary-term]Keynes' law:[/glossary-term]
[glossary-definition]"demand creates its own supply"[/glossary-definition]
[glossary-term]neoclassical economists:[/glossary-term]
[glossary-definition]economists who generally emphasize the importance of aggregate supply in determining the size of the macroeconomy over the long run[/glossary-definition]
[glossary-term]Say's law:[/glossary-term]
[glossary-definition]"supply creates its own demand"[/glossary-definition]
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9.24: Neoclassical and Keynesian Perspectives in the AD-AS Model

Learning Objectives

- Explain why the neoclassical zone of the AS curve illustrates Say's Law
- Explain why the Keynesian zone of the AS curve illustrates Keynes' Law
- Explain why the intermediate zone illustrates a blend of Say's and Keynes' Laws

The AD-AS model can be used to illustrate both **Say's law** that supply creates its own demand and **Keynes' law** that demand creates its own supply. Consider the three zones of the SRAS curve as identified in Figure 1: the Keynesian zone, the neoclassical zone, and the intermediate zone.

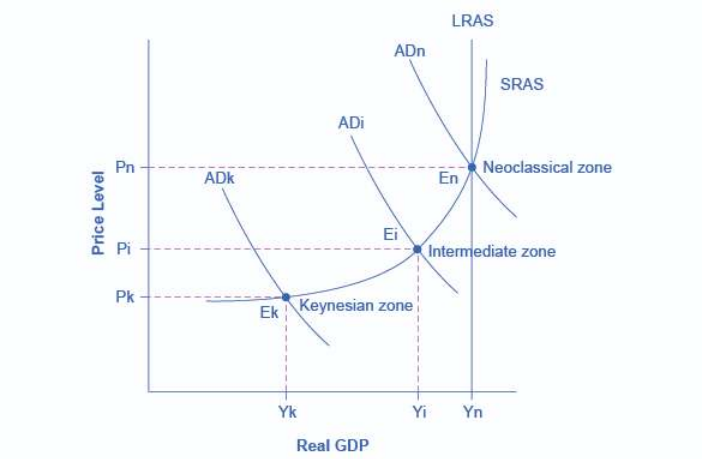


Figure 1. Keynes, Neoclassical, and Intermediate Zones in the Aggregate Supply Curve. Near the equilibrium Ek, in the Keynesian zone at the far left of the SRAS curve, small shifts in AD, either to the right or the left, will affect the output level Yk, but will not much affect the price level. In the Keynesian zone, AD largely determines the quantity of output. Near the equilibrium En, in the neoclassical zone at the far right of the SRAS curve, small shifts in AD, either to the right or the left, will have relatively little effect on the output level Yn, but instead will have a greater effect on the price level. In the neoclassical zone, the near-vertical SRAS curve close to the level of potential GDP largely determines the quantity of output. In the intermediate zone around equilibrium Ei, movement in AD to the right will increase both the output level and the price level, while a movement in AD to the left would decrease both the output level and the price level.

Focus first on the **Keynesian zone**, that portion of the SRAS curve on the far left which is relatively flat. If the AD curve crosses this portion of the SRAS curve at an equilibrium point like Ek, then certain statements about the economic situation will follow. In the Keynesian zone, the equilibrium level of real GDP is far below potential GDP, the economy is in recession, and cyclical unemployment is high. If aggregate demand shifted to the right or left in the Keynesian zone, it will determine the resulting level of output (and thus unemployment). However, inflationary price pressure is not much of a worry in the Keynesian zone, since the price level does not vary much in this zone.

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Now, focus your attention on the **neoclassical zone** of the SRAS curve, which is the near-vertical portion on the right-hand side. If the AD curve crosses this portion of the SRAS curve at an equilibrium point like En where output is at or near potential GDP, then the size of potential GDP pretty much determines the level of output in the economy. Since the equilibrium is near potential GDP, cyclical unemployment is low in this economy, although structural unemployment may remain an issue. In the neoclassical zone, shifts of aggregate demand to the right or the left have little effect on the level of output or employment. The only way to increase the size of the real GDP in the neoclassical zone is for AS to shift to the right. However, shifts in AD in the neoclassical zone will create pressures to change the price level.

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Finally, consider the **intermediate zone** of the SRAS curve in Figure 1. If the AD curve crosses this portion of the SRAS curve at an equilibrium point like Ei, then we might expect unemployment and inflation to move in opposing directions. For instance, a shift of AD to the right will move output closer to potential GDP and thus reduce unemployment, but will also lead to a higher price level and upward pressure on inflation. Conversely, a shift of AD to the left will move output further from potential GDP and raise unemployment, but will also lead to a lower price level and downward pressure on inflation.

This approach of dividing the SRAS curve into different zones works as a diagnostic test that can be applied to an economy, like a doctor checking a patient for symptoms. First, figure out what zone the economy is in and then the economic issues, tradeoffs, and policy choices will be clarified. Some economists believe that the economy is strongly predisposed to be in one zone or another. Thus, hard-line Keynesian economists believe that the economies are in the Keynesian zone most of the time, and so they view the neoclassical zone as a theoretical abstraction. Conversely, hard-line neoclassical economists argue that economies are in the neoclassical zone most of the time and that the Keynesian zone is a distraction. Later modules on the Keynesian perspective and the neoclassical perspective should help to clarify the underpinnings and consequences of these contrasting views of the macroeconomy.

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Watch It

Watch this video for further clarification about the three different types of aggregate supply curves. Each AS curve, or model, is accurate in describing the economy at different points in time.

An interactive or media element has been excluded from this version of the text. You can view it online here: http://pb.libretexts.org/mlum/?p=419

For even more practice at analyzing the graph and considering the differences between the neoclassical and Keynesian models, watch this video.

Summary

The SRAS curve can be divided into three zones. Keynes' law says demand creates its own supply, so that changes in aggregate demand cause changes in real GDP and employment. Keynes' law can be shown on the horizontal Keynesian zone of the aggregate supply curve. The Keynesian zone occurs at the left of the SRAS curve where it is fairly flat, so movements in AD will affect output, but have little effect on the price level. Say's law says supply creates its own demand. Changes in aggregate demand have no effect on real GDP and employment, only on the price level. Say's law can be shown on the vertical neoclassical zone of the aggregate supply curve. The neoclassical zone occurs at the right of the SRAS curve where it is fairly vertical, and so movements in AD will affect the price level, but have little impact on output. The intermediate zone in the middle of the SRAS curve is upward-sloping, so a rise in AD will cause higher output and price level, while a fall in AD will lead to a lower output and price level.

GlOSSARY

[glossary-page]
[glossary-term]intermediate zone:[/glossary-term]
[glossary-definition]portion of the SRAS curve where GDP is below potential but not so far below as in the Keynesian zone; the SRAS curve is upward-sloping, but not vertical in the intermediate zone[/glossary-definition]
[glossary-term]Keynes law:[/glossary-term]
[glossary-definition]the idea that the economy is driven by aggregate demand, while aggregate supply responds passively[/glossary-definition]
[glossary-term]Keynesian zone:[/glossary-term]
[glossary-definition]portion of the SRAS curve where GDP is far below potential and the SRAS curve is flat[/glossary-definition]
[glossary-term]neoclassical zone:[/glossary-term]

[glossary-definition]portion of the SRAS curve where GDP is at or near potential output where the SRAS curve is steep[/glossary-definition]
[glossary-term]Say's law: [/glossary-term][glossary-definition]the idea that the economy is driven by aggregate supply, while aggregate demand responds passively[/glossary-definition][/glossary-page]

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CHAPTER OVERVIEW

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10.2: Introduction to the Income-Expenditure Model
10.3: The Key Role of Aggregate Expenditure
10.4: Aggregate Expenditure- Consumption
10.5: Aggregate Expenditure- Investment, Government Spending, and Net Exports
10.6: Introduction to Equilibrium in the Income-Expenditure Model
10.7: Equilibrium in the Income-Expenditure Model
10.8: Finding Equilibrium Using Algebra
10.9: Learn By Doing- Finding Equilibrium Using Algebra
10.10: Recessionary and Inflationary Gaps in the Income-Expenditure Model
10.11: Real Aggregate Supply in the Income-Expenditure Model
10.12: Introduction to the Expenditure Multiplier in the Income-Expenditure Model
10.13: The Spending Multiplier in the Income-Expenditure Model
10.14: The Spending Multiplier and Changes in Government Spending
10.15: Putting It Together- The Income-Expenditure Model
10.16: Discussion- The Income-Expenditure Model
10.17: Assignment- The Income-Expenditure Model
10.18: Assignment- Problem Set — The Income-Expenditure Model

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10.1: Why It Matters- The Income-Expenditure Model

Why explain Keynesian economics using the Income-Expenditure Model?



Figure 1. Massive Container Freighter Ship MSC in the Santa Barbara Channel.

The Keynesian view of macroeconomics was developed during the Great Depression in the 1930s, long before the AD–AS model was popularized. Keynesian economics was traditionally explained with a different approach, known as the Income-Expenditure, or Keynesian Cross model. The Keynesian-Cross model is still useful today because it provides a much more detailed and intuitive explanation of aggregate demand than is given in the AD-AS model.

The two-decade long period from the mid-1980s to the mid-2000s became known as the Great Moderation, because it was a period of generally smooth economic growth punctuated by two very small recessions in 1990 and 2001. Then came the Great Recession of 2007-2008, which was as deep and any U.S. economic downturn since the Great Depression of the 1930s. What caused the Great Recession and what caused it to be so deep? The answers to these questions will be found in this module. You'll also learn:

- a richer understanding of the components of aggregate expenditure: consumption, investment, government spending, and net exports
- about what causes recessionary and inflationary gaps
- a more detailed explanation of the expenditure multiplier

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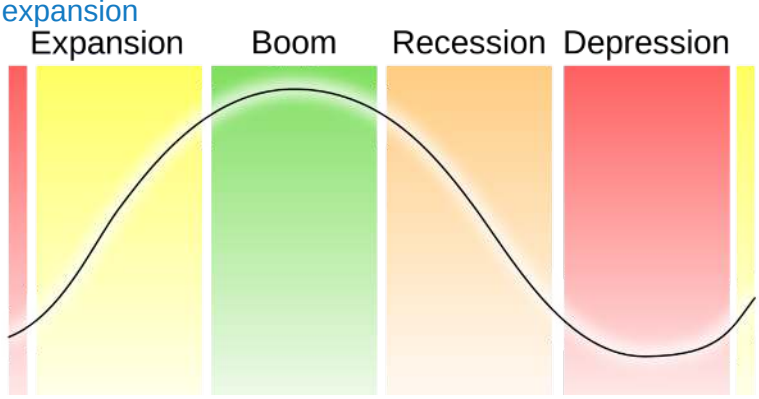
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10.2: Introduction to the Income-Expenditure Model

What you'll learn to do: use the income-expenditure model to explain periods of recession and expansion



You've already learned the basic tenets of Keynesian economics in the context of the aggregate demand-aggregate supply model. In this section, you'll learn about an alternative approach for thinking about the Keynesian perspective. This approach is known as the income-expenditure model, or the Keynesian cross diagram (also sometimes called the expenditure-output model or the aggregate-expenditure model). It explains in more depth what's behind the aggregate demand curve, and why the Keynesians believe what they do. The model looks at the relationship between GDP (or national income) and total expenditure.

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10.3: The Key Role of Aggregate Expenditure

Learning Objectives

- Describe the components of aggregate expenditure and their importance in the income-expenditure model

The Income-Expenditure Model

The fundamental assumption of Keynesian economics is that economic activity, that is, output and employment, are determined primarily by the amount of aggregate demand (or total spending) in the economy. This assumption made a great deal of sense during the Great Depression when GDP was so far below potential. When there are significant amounts of unemployed labor and capital (e.g. shutdown factories), it's hard to argue that lack of resources (e.g. aggregate supply) is the problem. The model makes no explicit mention of aggregate supply or of the price level (although as you will see, it is possible to draw some inferences about aggregate supply and price levels based on the diagram).

Remember that GDP can be thought of in several equivalent ways: it measures both the value of spending on final goods and also the value of the production of final goods. All sales of the final goods and services that make up GDP will eventually end up as income for workers, for managers, and for owners of firms. The sum of all the income received for contributing resources to GDP is called national income (Y). In the discussion that follows, we will use GDP and national income synonymously.

Building the Aggregate Expenditure Schedule

The income-expenditure model determines the equilibrium level of real GDP, from which one can infer the level of employment in the economy. The crux of the model is the aggregate expenditure schedule (or curve). Recall that aggregate expenditure is the sum of four parts: consumer expenditure, investment expenditure, government expenditure and net export expenditure.

$$\text{Aggregate Expenditure} = C + I + G + (X - M)$$

A key part of the Income-Expenditure model is understanding that as national income (or GDP) rises, so does aggregate expenditure. Over the next few pages, we'll review the components of aggregate expenditure, and examine how they are affected by national income. Then we will add the four components together to get aggregate expenditure.

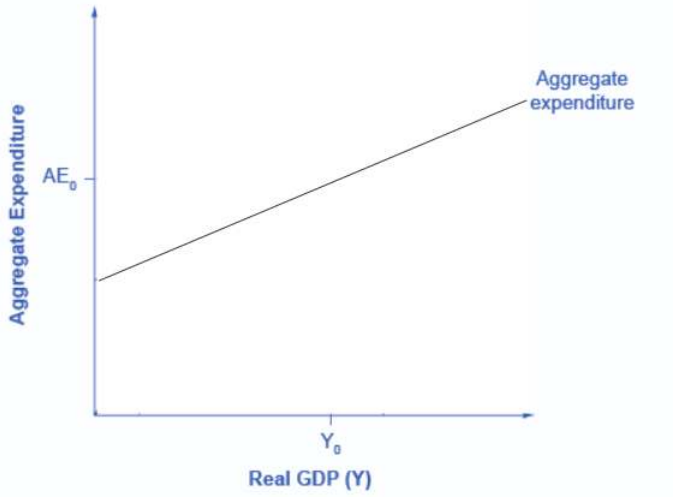


Figure 1. The Aggregate Expenditure Function shows the relationship between national income and aggregate expenditure.

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https://assessments.lumenlearning.co...sessments/7565

You should know that most of the material in the following pages is not new—we introduced it previously in the section on aggregate demand in Keynesian analysis. We are just looking at the material from a slightly different angle.

Glossary

[glossary-page][glossary-term]Aggregate Expenditure Function: [/glossary-term][glossary-definition] graphical relationship between national income as a function of aggregate expenditure, which is defined as consumption plus investment plus government spending plus net exports[/glossary-definition][glossary-term]Aggregate Expenditure Schedule[/glossary-term][glossary-definition]aggregate expenditure function expressed as a table[/glossary-definition][/glossary-page]

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10.4: Aggregate Expenditure- Consumption

Learning Objectives

- Explain and graph the consumption function
- Explain what would cause the consumption function to grow steeper or flatter, or to shift up or down

Aggregate Expenditure: Consumption as a Function of National Income

Keynes observed that consumption expenditure depends primarily on personal disposable income, i.e. one's take home pay. Let's examine this relationship in more detail. People can do two things with their income: they can consume it or they can save it. (For the moment, let's ignore the need to pay taxes with some of it). Each person who receives a raise in income faces this choice. Let's define the **marginal propensity to consume (MPC)** as the share (or percentage) of the additional income a person decides to consume (or spend). Similarly, the **marginal propensity to save (MPS)** is the share of the additional income the person decides to save. Since the only options are to consume or save income, it must always hold true that:

$$MPC + MPS = 1$$

For example, if the marginal propensity to consume out of the marginal amount of income earned is 0.9, then the marginal propensity to save is 0.1.

With this relationship in mind, consider the relationship among income, consumption, and savings shown in Table 1.

Table 1. The Consumption Function

Income	Consumption	Savings
$0	$600	–$600
$1,000	$1,400	–$400
$2,000	$2,200	–$200
$3,000	$3,000	$0
$4,000	$3,800	$200
$5,000	$4,600	$400
$6,000	$5,400	$600
$7,000	$6,200	$800
$8,000	$7,000	$1,000
$9,000	$7,800	$1,200

In Table 1, for each increase in income of $1000, consumption increases by $800. Thus, the marginal propensity to consumer (MPC) is 0.80. Any additional income which isn't spent is saved, so for each increase in income of $1000, saving increases by $200. The MPS is 0.20.

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The pattern of consumption shown in Table 1 is plotted in Figure 1. The relationship between income and consumption, whether in tabular or graphical form is called the **consumption function**. Both the table and figure illustrate a typical consumption function. There are a couple of features to observe. First, consumption expenditure increases as income does. For every increase in income, consumption increases by the MPC times that increase in income. Thus, the slope of the consumption function is the MPC. Second, at low levels of income, consumption is greater than income. Even if income were zero, people would have to consume

something. We call the level of consumption when income is zero **autonomous consumption**, since it shows the amount of consumption independent of income. In this example, consumption would be $600 even if income were zero. Thus, to calculate consumption at any level of income, multiply the income level by 0.8, for the marginal propensity to consume, and add $600, for the amount that would be consumed even if income was zero.

$$C = 600 + 0.8*Y$$

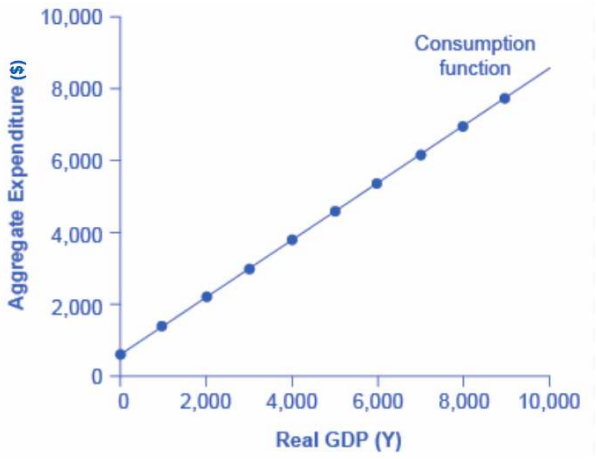


Figure 1. The Consumption Function. In the expenditure-output model, how does consumption increase with the level of national income? Output on the horizontal axis is conceptually the same as national income, since the value of all final output that is produced and sold must be income to someone, somewhere in the economy. At a national income level of zero, $600 is consumed. Then, each time income rises by $1,000, consumption rises by $800, because in this example, the marginal propensity to consume is 0.8.

A change in the marginal propensity to consume will change the slope of the consumption function. An increase in the MPC steepens the consumption function; a decrease in the MPC flattens it.

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A number of factors other than income can also cause the entire consumption function to shift. These factors were summarized in the earlier discussion of consumption. For example, changes in consumer expectations about the future, or changes in household wealth would cause the consumption function to shift up or down to a a new consumption function that is parallel to the original one.

Watch It

Watch the selected three-minute clip from this video to take another look at the consumption function and the marginal propensity to consume. Note that his graph is a rough sketch and not drawn entirely to scale.

An interactive or media element has been excluded from this version of the text. You can view it online here: http://pb.libretexts.org/mlum/?p=439

Watch this next video for more practice in graphing the consumption function. Then take it a step further to analyze what kind of impact an increase in income will have on consumer spending.

An interactive or media element has been excluded from this version of the text. You can view it online here: http://pb.libretexts.org/mlum/?p=439

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Glossary

[glossary-page]

[glossary-term]autonomous consumption: [/glossary-term][glossary-definition]The amount consumers spend if their income was zero; i.e. consumer spending which is caused by something other than income, for example, borrowing[/glossary-definition]

[glossary-term]consumption function: [/glossary-term][glossary-definition]graphical relationship between national income and consumption expenditure; algebraically: C = a + MPC*Y, where a is autonomous consumption (the amount of consumption expenditure when Y = 0), MPC is the marginal propensity to consume, and Y is national income[/glossary-definition]

[glossary-term]marginal propensity to consume: [/glossary-term]
[glossary-definition]fraction of any change in income which is spent; algebraically MPC = **Δ**C/**Δ**Y[/glossary-definition]

[glossary-term]marginal propensity to save: [/glossary-term][glossary-definition]fraction of any change in income which is saved; algebraically MPS = **Δ**S/**Δ**Y[/glossary-definition][/glossary-page]

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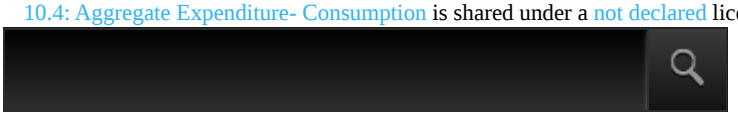
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10.5: Aggregate Expenditure- Investment, Government Spending, and Net Exports

Learning Objectives

- Explain the investment, government spending, and net export functions
- Explain how the aggregate expenditure curve is constructed from the consumption, investment, government spending and net export functions

You just read about the consumption function, but consumption is only one component of aggregate expenditure:

$$\text{Aggregate Expenditure} = C + I + G + (X - M).$$

Now let's turn our attention to the other components in order to build a function for the total aggregate expenditures.

Aggregate Expenditure: Investment as a Function of National Income

Just as a consumption function shows the relationship between real GDP (or national income) and consumption levels, the investment function shows the relationship between real GDP and investment levels. When businesses make decisions about whether to build a new factory or to place an order for new computer equipment, their decision is forward-looking, based on expected rates of return, and the interest rate at which they can borrow for the investment expenditure. Investment decisions do *not* depend primarily on the level of GDP in the current year. Thus, the investment function can be drawn as a horizontal line, at a fixed level of expenditure. The slope of the investment function is zero, indicating no relationship between GDP and investment. Figure 1 shows an investment function where the level of investment is, for the sake of concreteness, set at the specific level of 500.

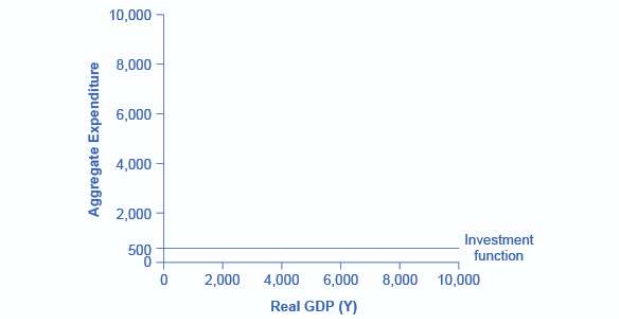


Figure 1. The Investment Function. The investment function is drawn as a horizontal line because investment is based on interest rates and expectations about the future, and so it does not change with the level of current national income. In this example, investment expenditures are at a level of 500. However, changes in factors like technological opportunities, expectations about near-term economic growth, and interest rates would all cause the investment function to shift up or down.

The appearance of the investment function as a horizontal line does not mean that the level of investment never changes. It means only that in the context of this two-dimensional diagram, the level of investment on the vertical aggregate expenditure axis does not vary with changes in the current level of GDP on the horizontal axis. However, all the other factors that influence investment—new technological opportunities, expectations about near-term economic growth, interest rates, the price of key inputs, and tax incentives for investment—can cause the horizontal investment function to shift up or down.

Aggregate Expenditure: Government Spending and Taxes as a Function of National Income

Federal, state and local governments determine the level of government spending through the budget process. In the Keynesian cross diagram, government spending appears as a horizontal line, as in Figure 2, where government spending is set at a level of 1,300 regardless of the level of GDP. As in the case of investment spending, this horizontal line does not mean that government spending is unchanging, only that it is independent of GDP.

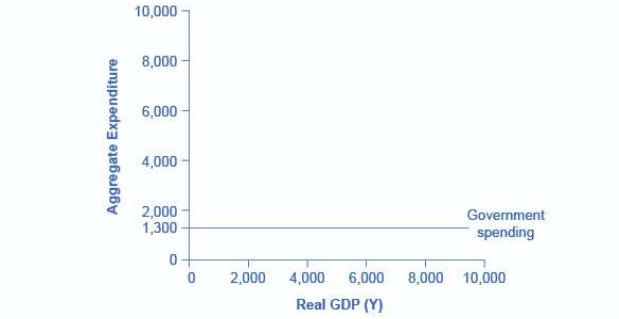


Figure 2. The Government Spending Function. The level of government spending is determined by political factors, not by the level of real GDP in a given year. Thus, government spending is drawn as a horizontal line. In this example, government spending is at a level of 1,300. Congressional decisions to increase government

spending will cause this horizontal line to shift up, while decisions to reduce spending would cause it to shift down.

The situation of taxes is different because taxes often rise or fall with the volume of economic activity. For example, income taxes are based on the level of income earned and sales taxes are based on the amount of sales made, and both income and sales tend to be higher when the economy is growing and lower when the economy is in a recession. For the purposes of constructing the basic Keynesian cross diagram, it is helpful to view taxes as an average percentage of income. In the United States, for example, taking federal, state, and local taxes together, government typically collects about 30–35% of national income as taxes.

Table 2 revises the earlier table on the consumption function so that it takes taxes into account. The first column shows national income. The second column calculates taxes, which in this example are set at a rate of 30%, or 0.3. The third column shows after-tax income; that is, total income minus taxes. The fourth column then calculates consumption in the same manner as before: multiply after-tax income by 0.8, representing the marginal propensity to consume, and then add $600, for the amount that would be consumed even if income was zero. When taxes are included, the marginal propensity to consume is reduced by the amount of the tax rate, so each additional dollar of income results in a smaller increase in consumption than before taxes. For this reason, the consumption function, with taxes included, is flatter than the consumption function without taxes, as Figure 3 shows.

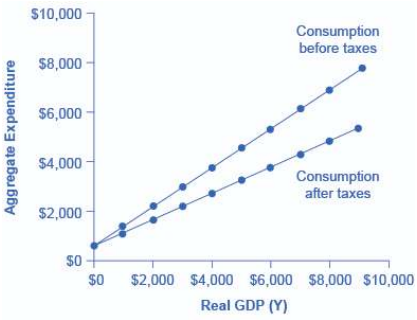


Figure 3. The Consumption Function Before and After Taxes. The upper line repeats the consumption function from previously. The lower line shows the consumption function if taxes must first be paid on income, and then consumption is based on after-tax income.

Table 2. The Consumption Function Before and After Taxes

Income	Taxes	After-Tax Income	Consumption	Savings
$0	$0	$0	$600	–$600
$1,000	$300	$700	$1,160	–$460
$2,000	$600	$1,400	$1,720	–$320
$3,000	$900	$2,100	$2,280	–$180
$4,000	$1,200	$2,800	$2,840	–$40
$5,000	$1,500	$3,500	$3,400	$100
$6,000	$1,800	$4,200	$3,960	$240
$7,000	$2,100	$4,900	$4,520	$380
$8,000	$2,400	$5,600	$5,080	$520
$9,000	$2,700	$6,300	$5,640	$660

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Aggregate Expenditure: Export and Imports as a Function of National Income

The export function, which shows how exports change with the level of a country's own real GDP, is drawn as a horizontal line, as in the example in Figure 4(a) where exports are drawn at a level of $840. Again, as in the case of investment spending and government spending, drawing the export function as horizontal does not imply that exports never change. It just means that they do not change because of what is on the horizontal axis—that is, a country's own level of domestic production—and instead are shaped by the level of aggregate demand in other countries. More demand for exports from other countries would cause the export function to shift up; less demand for exports from other countries would cause it to shift down.

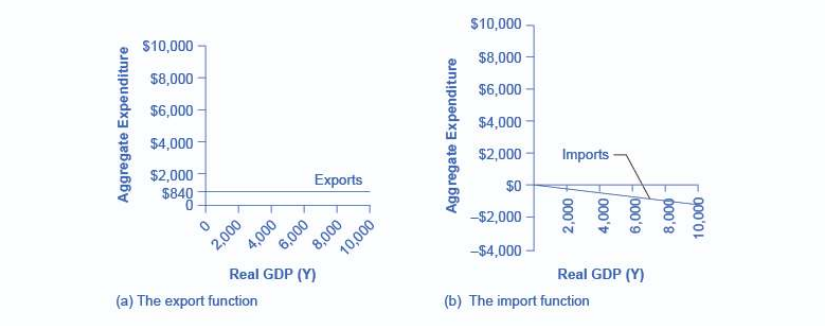


Figure 4. The Export and Import Functions. (a) The export function is drawn as a horizontal line because exports are determined by the buying power of other countries and thus do not change with the size of the domestic economy. In this example, exports are set at 840. However, exports can shift up or down, depending on buying patterns in other countries. (b)The import function is drawn in negative territory because expenditures on imported products are a subtraction from expenditures in the domestic economy. In this example, the marginal propensity to import is 0.1, so imports are calculated by multiplying the level of income by –0.1.

Imports are drawn in the Keynesian cross diagram as a downward-sloping line. The slope is given by the **marginal propensity to import (MPI),** which is the percentage change in spending on imports when national income changes. The slope is *negative* because since aggregate expenditure measures spending on *domestic* goods and services, spending on imports takes away from aggregate expenditure; thus, the MPI is negative.

In Figure 4(b), the marginal propensity to import is 0.1. Thus, if real GDP is $5,000, imports are $500; if real GDP is $6,000, imports are $600, and so on. The import function is drawn as downward sloping and negative, because it represents a subtraction from the aggregate expenditures in the domestic economy. A change in the marginal propensity to import, perhaps as a result of changes in preferences, would alter the slope of the import function.

Putting It Together: The Aggregate Expenditure Function

The final step in the deriving the **aggregate expenditure function**, which shows the total expenditures in the economy for each level of real GDP, is to sum the parts, which is shown in Table 3.

Table 3. The Aggregate Expenditure Function

Income	Consumption	Investment	Government Spending	Net Exports	Aggregate Expenditure
$0	$600	$500	$1,300	$840	$3,240
$1,000	$1,160	$500	$1,300	$740	$3,700
$2,000	$1,720	$500	$1,300	$640	$4,160
$3,000	$2,280	$500	$1,300	$540	$4,620
$4,000	$2,840	$500	$1,300	$440	$5,080
$5,000	$3,400	$500	$1,300	$340	$5,540
$6,000	$3,960	$500	$1,300	$240	$6,000
$7,000	$4,520	$500	$1,300	$140	$6,460
$8,000	$5,080	$500	$1,300	$40	$6,920
$9,000	$5,640	$500	$1,300	-$ 60	$7,380

Each of the columns in Table 3 comes from the previous tables and figures. For example the second column, consumption, comes from Table 2, and the fifth column, net exports, is computed from the numbers in Figure 4. Taking national income (or Real GDP) from column 1 and aggregate expenditure from column 6, we can graph the aggregate expenditure function.

Graphically, the **aggregate expenditure function** is formed by adding together (or stacking on top of each other) the consumption function (after taxes), the investment function, the government spending function, and the net export function. In its most basic form, the graph of aggregate expenditures looks like the graph shown in Figure 5.

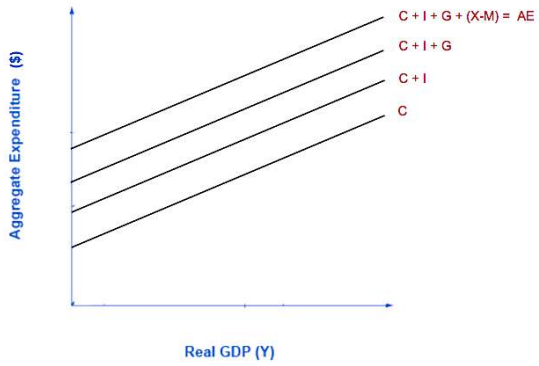


Figure 5. Graphing Aggregate Expenditure. The aggregate expenditure is the vertical sum of C + I + G + (X-M).

The actual graph for the aggregate expenditure data in Table 3 is slightly more complicated, due to the effect of imports, as shown in Figure 6. Let's think carefully about how this works. Investment spending and government spending are fixed amounts; thus, adding the investment and government spending functions shifts the aggregate expenditure line up, parallel to the consumption function. Export expenditures are also a fixed amount, but import expenditures are not. Imports are a negative function of national income, so the net export function is downward sloping with a slope equal to the marginal propensity to import. As a result, when we add net exports to aggregate expenditure, the AE curve becomes flatter, which you can see in the figure.

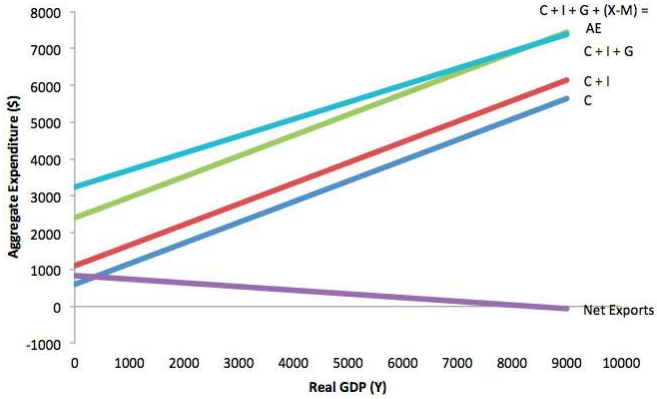


Figure 6. The Aggregate Expenditure Curve. The aggregate expenditure is the vertical sum of C + I + G + (X-M). Adding I,G and X shifts the function upward. Adding M flattens the curve.

In sum, the vertical intercept of the aggregate expenditure function, that is, the point at which the aggregate expenditure function intersects the vertical axis is **autonomous expenditure**, i.e. all the components of aggregate expenditure (e.g. autonomous consumption, investment, government, and export expenditures)—which do not vary with national income. The upward slope of the aggregate expenditure function will be determined by the marginal propensity to consume, the tax rate, and the marginal propensity to import. A lower marginal propensity to consume, a higher tax rate, and a higher marginal propensity to import will all make the slope of the aggregate expenditure function flatter—because out of any extra income, more is going to savings or taxes or imports and less to spending on domestic goods and services.

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Glossary

[glossary-page][glossary-term]Aggregate Expenditure Function:[/glossary-term][glossary-definition]graphical relationship between national income as a function of aggregate expenditure, which is defined as consumption plus investment plus government spending plus net exports[/glossary-definition][glossary-term]Aggregate Expenditure Schedule:[/glossary-term][glossary-definition]aggregate expenditure function expressed as a table[/glossary-definition][glossary-term]Autonomous Expenditures:[/glossary-term][glossary-definition]all the components of aggregate expenditure, which do not vary with national income; these include autonomous consumption, investment, government, and export expenditures[/glossary-definition][glossary-term]Consumption Function:[/glossary-term][glossary-definition]graphical relationship between national income and consumption expenditure; algebraically: C = a + MPC*Y, where a is autonomous consumption (the amount of consumption expenditure

when Y = 0), MPC is the marginal propensity to consume, and Y is national income[/glossary-definition][glossary-term]Government Spending Function: [/glossary-term]
[glossary-definition]horizontal line showing the relationship between national income and government spending[/glossary-definition][glossary-term]Investment Expenditure Function: [/glossary-term]
[glossary-definition]horizontal line showing the relationship between national income and investment expenditure[/glossary-definition][glossary-term]Marginal Propensity to Consume:[/glossary-term]
[glossary-definition]fraction of any change in income which is spent; algebraically MPC =**Δ**C /**Δ**Y[/glossary-definition][glossary-term]Marginal Propensity to Import:[/glossary-term][glossary-definition]fraction of any change in income which is spent; algebraically MPI =**Δ**M /**Δ**Y[/glossary-definition][glossary-term]Marginal Propensity to Save:[/glossary-term][glossary-definition]fraction of any change in income which is saved; algebraically MPS = **Δ**S /**Δ**Y[/glossary-definition][glossary-term]Net Export Function:[/glossary-term][glossary-definition]graphical relationship between national income and net exports (export expenditures minus import expenditures)[/glossary-definition][/glossary-page]

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10.6: Introduction to Equilibrium in the Income-Expenditure Model

What you'll learn to do: explain and find macro equilibrium in the income-expenditure model



Macro equilibrium in the income-expenditure model is found at the point where the level of GDP, or national income, equals aggregate expenditure. Graphically, this is easy to see as a point along the line that evenly divides the two axis on the graph. This line, called the 45 degree line, shows the only point on the aggregate expenditure line where the total quantity of goods and services being purchased (AD) equals the total quantity of goods and services being produced (AS). Read on to practice finding equilibrium in the income-expenditure model, then apply these principles to recessions and inflations in Keynesian policy.

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10.7: Equilibrium in the Income-Expenditure Model

Learning Objectives

- Explain macro equilibrium using the income-expenditure model
- Identify macro equilibrium graphically and using tables

In the AD-AS model, we identified the macro equilibrium at the level of GDP where AD=AS. We now have the tools to identify macro equilibrium in the income-expenditure model. Macro equilibrium occurs at the level of GDP where national income equals aggregate expenditure. Let's find the macro equilibrium in the graphical model.

The Aggregate Expenditure Function

Figure 1 shows the aggregate expenditure function, based on data in Table 1. As we showed in the last section, aggregate expenditure is the sum of consumption expenditure, investment expenditure, government expenditure and net export expenditure.

Table 1. National Income-Aggregate Expenditure Equilibrium

National Income	Aggregate Expenditure
$3,000	$4,620
$4,000	$5,080
$5,000	$5,540
$6,000	$6,000
$7,000	$6,460
$8,000	$6,920
$9,000	$7,380

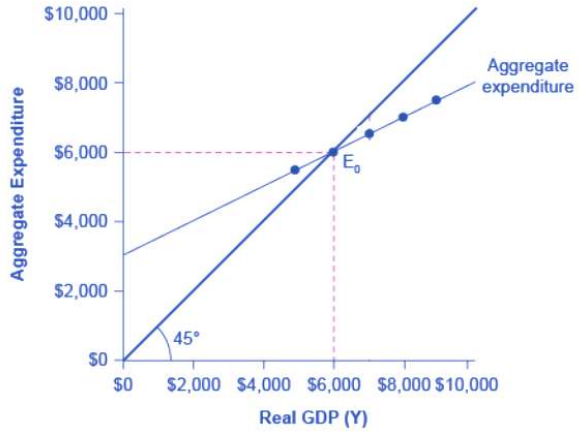


Figure 1. A Keynesian Cross Diagram. The combination of the aggregate expenditure line and the income=expenditure line is the Keynesian Cross, that is, the graphical representation of the income-expenditure model. The equilibrium occurs where aggregate expenditure is equal to national income; this occurs where the aggregate expenditure schedule crosses the 45-degree line, at a real GDP of $6,000.

The Income = Expenditure Line

Figure 1 contains two lines that serve as conceptual guideposts to orient the discussion. The first is the aggregate expenditure line that we've already discussed. The second conceptual line on the Keynesian cross diagram is the line showing where national income = aggregate expenditure. This line is mathematically the 45-degree line, which starts at the origin and reaches up and to the

right. A line that stretches up at a 45-degree angle represents the set of points (1,1), (2,2), (3,3) and so on, where the measurement on the vertical axis is equal to the measurement on the horizontal axis. Thus in this diagram, the 45-degree line shows the set of points where the level of aggregate expenditure in the economy, measured on the vertical axis, is equal to the level of output or national income in the economy, measured by GDP on the horizontal axis. In short, this is our equilibrium condition. The combination of the aggregate expenditure line and the income=expenditure line (i.e. the 45 degree line) *is* the Keynesian Cross.

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Where Equilibrium Occurs

Macro equilibrium occurs at the level of GDP where where the aggregate expenditure line crosses the 45-degree line (which shows all points where AE = Y). It is the only point on the aggregate expenditure line where the total quantity of goods and services being purchased (AD) equals the total quantity of goods and services being produced (AS). In Figure 1, this point of equilibrium (E_0) happens at 6,000, which can also be read off Table 1.

The meaning of "equilibrium" remains the same; that is, equilibrium is a point of balance where no incentive exists to shift away from that outcome. To understand why the point of intersection between the aggregate expenditure function and the 45-degree line is a macroeconomic equilibrium, consider what would happen if an economy found itself to the right of the equilibrium point E, say point H in Figure 2, where output is higher than the equilibrium. At point H, the level of aggregate expenditure is below the 45-degree line, so that the level of aggregate expenditure in the economy is less than the level of output. As a result, at point H, output is piling up unsold—not a sustainable state of affairs. Firms will respond by decreasing their level of production and GDP will fall.

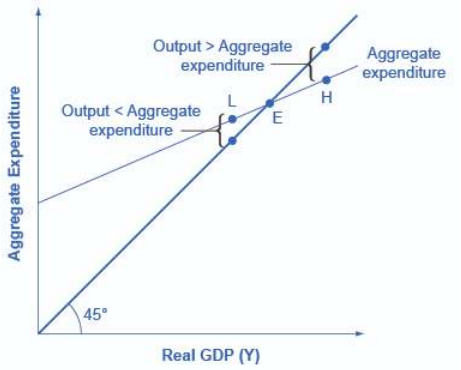


Figure 2. Equilibrium in the Keynesian Cross Diagram. If output was above the equilibrium level, at H, then the real output is greater than the aggregate expenditure in the economy. If output was below the equilibrium level at L, then aggregate expenditure would be greater than output. Only point E can be at equilibrium, where output, or national income and aggregate expenditure, are equal. The equilibrium (E) must lie on the 45-degree line, which is the set of points where national income and aggregate expenditure are equal.

Conversely, consider the situation where the level of output is at point L—where real output is lower than the equilibrium. In that case, the level of aggregate demand in the economy is above the 45-degree line, indicating that the level of aggregate expenditure in the economy is greater than the level of output. When the level of aggregate demand has emptied the store shelves, it cannot be sustained, either. Firms will respond by increasing their level of production and GDP will rise. Thus, the equilibrium must be the point where the amount produced and the amount spent are in balance, at the intersection of the aggregate expenditure function and the 45-degree line.

Try It

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Try It

This exercise is designed to show you how to find a new equilibrium in the income-expenditure model following a change in aggregate expenditure.

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Glossary

[glossary-page][glossary-term]Aggregate Expenditure Function:[/glossary-term][glossary-definition]graphical relationship between national income and aggregate expenditure, which is defined as consumption plus investment plus government spending plus net exports[/glossary-definition][glossary-term]Aggregate Expenditure Schedule:[/glossary-term][glossary-definition]aggregate expenditure function expressed as a table[/glossary-definition][glossary-term]Consumption Function:[/glossary-term][glossary-definition]graphical relationship between national income and consumption expenditure; algebraically: C = a + MPC*Y, where a is autonomous consumption (the amount of consumption expenditure when Y = 0), MPC is the marginal propensity to consume, and Y is national income[/glossary-definition][glossary-term]Income = Expenditure Line:[/glossary-term]
[glossary-definition]all combinations of national income and aggregate expenditure where national income equals aggregate expenditure; graphically, this is the 45 degree line on the Keynesian Cross diagram (or income-expenditure model)[/glossary-definition][glossary-term]Marginal Propensity to Consume:[/glossary-term][glossary-definition]fraction of any change in income which is spent; algebraically MPC = ΔC/ΔY[/glossary-definition][glossary-term]Marginal Propensity to Save:[/glossary-term][glossary-definition]fraction of any change in income which is saved; algebraically MPS = ΔS/ΔY[/glossary-definition]
[/glossary-page]

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10.8: Finding Equilibrium Using Algebra

Learning Objectives

- Find the macro equilibrium using algebra

In the income-expenditure model, the equilibrium occurs at the level of GDP where aggregate expenditures equal national income (or GDP). We can identify this equilibrium using algebra as well as graphically. Given algebraic equations for the aggregate expenditure line and the income=expenditure line, the point where they cross can be readily calculated.

USING AN ALGEBRAIC APPROACH TO THE EXPENDITURE-OUTPUT MODEL

Imagine an economy defined by the following:

$$C = 140 + 0.9\ (Yd).$$

This is the consumption function where 140 is autonomous consumption, 0.9 is the marginal propensity to consume, and Yd is disposable (i.e. after tax income).

Yd = Y- T, where Y is national income (or GDP) and T = Tax Revenues = 0.3Y; note that 0.3 is the average income tax rate.

I = Investment = 400

G = Government spending = 800

X = Exports = 600

M = Imports = 0.15Y

Step 1. Determine the aggregate expenditure function. Using the numbers from above, it is:

AE	=	C + I + G + X – M
AE	=	140 + 0.9(Y – T) + 400 + 800 + 600 – 0.15Y

Step 2. The equation for the 45-degree line is the set of points where GDP or national income on the horizontal axis is equal to aggregate expenditure on the vertical axis. Thus, the equation for the 45-degree line is: AE = Y.

Step 3. The next step is to solve these two equations for Y (or AE, since they will be equal to each other). Substitute Y for AE:

$$Y = AE = 140 + 0.9(Y – T) + 400 + 800 + 600 – 0.15Y$$

Step 4. Insert the term 0.3Y for the tax rate T. This produces an equation with only one variable, Y.

Step 5. Work through the algebra and solve for Y.

Y	=	140 + 0.9(Y – 0.3Y) + 400 + 800 + 600 – 0.15Y
Y	=	140 + 0.9Y –0.27Y + 1800 – 0.15Y
Y	=	1940 + 0.48Y
Y – 0.48Y	=	1940
0.52Y	=	1940
$\displaystyle\frac{0.52\text{Y}}{0.52}$	=	$\displaystyle\frac{1940}{0.52}$
Y	=	3730

This algebraic framework is flexible and useful in predicting how economic events and policy actions will affect real GDP.

Say, for example, that because of changes in the relative prices of domestic and foreign goods, the marginal propensity to import falls to 0.1. Calculate the equilibrium output when the marginal propensity to import is changed to 0.10.

Y	=	140 + 0.9(Y – 0.3Y) + 400 + 800 + 600 – 0.1Y
Y	=	1940 – 0.53Y
0.47Y	=	1940
Y	=	4127

Alternatively, suppose because of a surge of business confidence, investment rises to 500. Calculate the equilibrium output.

Y	=	140 + 0.9(Y – 0.3Y) + 500 + 800 + 600 – 0.15Y
Y	=	2040 + 0.48Y
Y – 0.48Y	=	2040
0.52Y	=	2040
Y	=	3923

Exercise: Consumption in the Income-Expenditure Model

Let's work through another example. Suppose that the amount of autonomous consumption is $20. Assume that taxes are 0.2 of real GDP. Let the marginal propensity to save of after-tax income be 0.1. The level of investment is $70, the level of government spending is $80, and the level of exports is $50. Imports are 0.2 of after-tax income. Given these values, you need to complete the table and then answer these questions: What is the consumption function? What is the equilibrium? Why is a national income of $300 not at equilibrium? How do expenditures and output compare at this point?

National Income	Taxes	After-tax income	Consumption	I + G + X	Imports	Aggregate Expenditures
$300			$236			
$400						
$500						
$600						
$700						

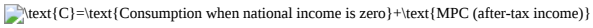
Step 1. Calculate the amount of taxes for each level of national income (reminder: GDP = national income) for each level of national income using the following as an example:

Step 2. Calculate after-tax income by subtracting the tax amount from national income for each level of national income using the following as an example:

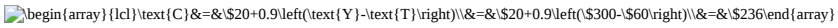
Step 3. Calculate consumption. The marginal propensity to save is given as 0.1. This means that the marginal propensity to consume is 0.9, since MPS + MPC = 1. Therefore, multiply 0.9 by the after-tax income amount using the following as an example:

Step 4. Consider why the table shows consumption of $236 in the first row. As mentioned earlier, the Keynesian model assumes that there is some level of consumption even without income. That amount is $236 – $216 = $20.

Step 5. There is now enough information to write the consumption function. The consumption function is found by figuring out the level of consumption that will happen when income is zero. Remember that:



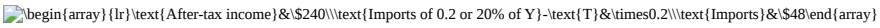
Let C represent the consumption function, Y represent national income, and T represent taxes.



Step 6. Use the consumption function to find consumption at each level of national income.

Step 7. Add investment (I), government spending (G), and exports (X). Remember that these do not change as national income changes:

Step 8. Find imports, which are 0.2 of after-tax income at each level of national income. For example:

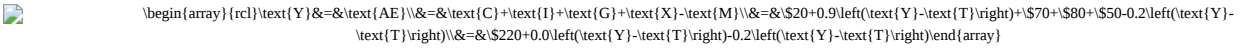


Step 9. Find aggregate expenditure by adding C + I + G + X – I for each level of national income. Your completed table should look like this:

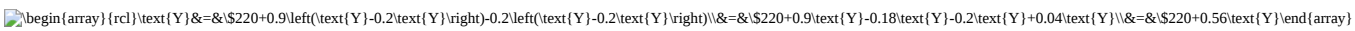
National Income (Y)	Tax = 0.2 × Y (T)	After-tax income (Y – T)	Consumption C = $20 + 0.9(Y – T)	I + G + X	Minus Imports (M)	Aggregate Expenditures AE = C + I + G + X – M
$300	$60	$240	$236	$200	$48	$388
$400	$80	$320	$308	$200	$64	$444
$500	*$100*	*$400*	*$380*	*$200*	*$80*	*$500*
$600	$120	$480	$452	$200	$96	$556
$700	$140	$560	$524	$200	$112	$612

Step 10. Answer the question: What is equilibrium? Equilibrium occurs where AE = Y. This table shows that equilibrium occurs where national income equals aggregate expenditure at $500.

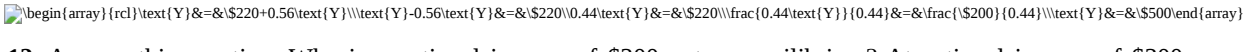
Step 11. Find equilibrium mathematically, knowing that national income is equal to aggregate expenditure.Step 10. Answer the question: What is equilibrium? Equilibrium occurs where AE = Y. The table shows that equilibrium occurs where national income equals aggregate expenditure at $500.



Since T is 0.2 of national income, substitute T with 0.2 Y so that:



Solve for Y.



Step 12. Answer this question: Why is a national income of $300 not an equilibrium? At national income of $300, aggregate expenditures are $388.

Step 13. Answer this question: How do expenditures and output compare at this point? Aggregate expenditures cannot exceed output (GDP) in the long run, since there would not be enough goods to be bought.

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10.9: Learn By Doing- Finding Equilibrium Using Algebra

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This question allow you to get as much practice as you need, as you can click the link at the top of the question (“Try another version of this question”) to get a new question. Practice until you feel comfortable doing the question.

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Try It

These questions allow you to get as much practice as you need, as you can click the link at the top of the first question (“Try another version of these questions”) to get a new set of questions. Practice until you feel comfortable doing the questions.

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Try It

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10.10: Recessionary and Inflationary Gaps in the Income-Expenditure Model

Learning Objectives

- Define potential real GDP and be able to draw and explain the potential GDP line
- Identify appropriate Keynesian policies in response to recessionary and inflationary gaps

The Potential GDP Line

Figure 1 shows a Keynesian cross diagram with one additional feature: the potential GDP line. This feature is a vertical line showing potential real GDP. That is, we know GDP increases from left to right on the graph. At some point we reach potential GDP, and that's what the Line shows. Potential GDP means the same thing here that it means in the AD-AS diagrams: it refers to the quantity of output that the economy can produce with full employment of its labor and physical capital. At any level of GDP less than potential, usually we have less than full employment. If we measure the unemployment rate at potential GDP, we get the natural rate of unemployment, that we defined in our earlier discussion on unemployment and inflation.

Recessionary and Inflationary Gaps

In the Keynesian cross diagram, if the aggregate expenditure line intersects the 45-degree line at the level of potential GDP, then the economy is in sound shape. There is no recession, and unemployment is at the natural rate–what we call full employment. But there is no guarantee that the equilibrium will occur at the potential GDP level of output. The equilibrium might be higher or lower.

Figure 1(a) illustrates a situation where the aggregate expenditure line intersects the 45-degree line at point E_0, which is a real GDP of $6,000, and which is below the potential GDP of $7,000. In this situation, the level of aggregate expenditure is too low for GDP to reach its full employment level, and unemployment will occur. The distance between an output level like E_0 that is below potential GDP and the level of potential GDP is called a **recessionary gap**. Because the equilibrium level of real GDP is so low, firms will not wish to hire the full employment number of workers, and unemployment will be high.

What might cause a recessionary gap? Anything that shifts the aggregate expenditure line down is a potential cause of recession, including a decline in consumption, a rise in savings, a fall in investment, a drop in government spending or a rise in taxes, or a fall in exports or a rise in imports. Moreover, an economy that is at equilibrium with a recessionary gap may just stay there and suffer high unemployment for a long time; remember, the meaning of equilibrium is that there is no particular adjustment of prices or quantities in the economy to chase the recession away.

The Keynesian response to a recessionary gap is for the government to reduce taxes or increase spending so that the aggregate expenditure function shifts up from AE_0 to AE_1. When this shift occurs, the new equilibrium E_1 now occurs at potential GDP as shown in Figure 1(a).

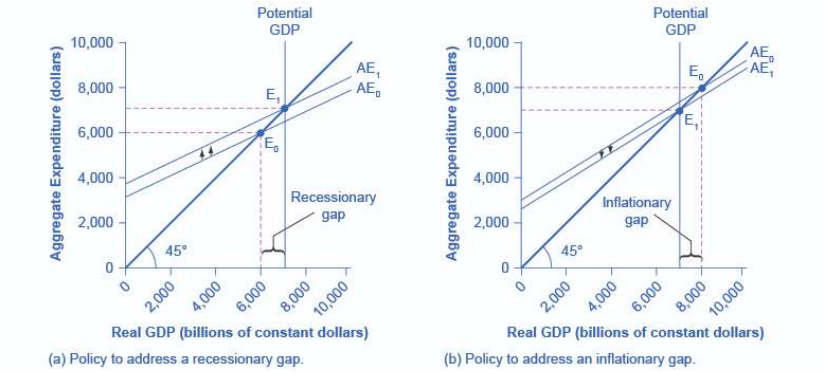


Figure 1.Addressing Recessionary and Inflationary Gaps. (a) If the equilibrium occurs at an output below potential GDP, then a recessionary gap exists. The policy solution to a recessionary gap is to shift the aggregate expenditure schedule up from AE_0 to AE_1, using policies like tax cuts or government spending increases. Then the new equilibrium E_1 occurs at potential GDP. (b)If the equilibrium occurs at an output above potential GDP, then an inflationary gap exists. The policy solution to an inflationary gap is to shift the aggregate expenditure schedule down from AE_0 to AE_1, using policies like tax increases or spending cuts. Then, the new equilibrium E_1 occurs at potential GDP.

Conversely, Figure 1(b) shows a situation where the aggregate expenditure schedule (AE_0) intersects the 45-degree line above potential GDP. The gap between the level of real GDP at the equilibrium E_0 and potential GDP is called an **inflationary gap**. The inflationary gap also requires a bit of interpreting. After all, a naïve reading of the Keynesian cross diagram might suggest that if the aggregate expenditure function is just pushed up high enough, real GDP can be as large as desired—even doubling or tripling the potential GDP level of the economy. This implication is clearly wrong. If the macro equilibrium occurs beyond potential GDP, real GDP is limited to potential; the remaining increase is only nominal. After all, an economy faces some supply-side limits on how much it can produce at a given time with its existing quantities of workers, physical and human capital, technology, and market institutions.

The inflationary gap should be interpreted, not as a literal prediction of how large real GDP will be, but as a statement of how much extra aggregate expenditure is in the economy beyond what is needed to reach potential GDP. An inflationary gap suggests that because the economy cannot produce

enough goods and services to absorb this level of aggregate expenditures, the spending will instead cause an inflationary increase in the price level. In this way, even though changes in the price level do not appear explicitly in the Keynesian cross equation, the notion of inflation is implicit in the concept of the inflationary gap.

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The appropriate Keynesian response to an inflationary gap is shown in Figure 1(b). The original intersection of aggregate expenditure line AE_0 and the 45-degree line occurs at $8,000, which is above the level of potential GDP at $7,000. If AE_0 shifts down to AE_1, so that the new equilibrium is at E_1, then the economy will be at potential GDP without pressures for inflationary price increases. The government can achieve a downward shift in aggregate expenditure by increasing taxes on consumers or firms, or by reducing government expenditures.

One final note: recessionary and inflationary gaps are related to the empirical concept of the GDP gap we defined earlier in this module. A recessionary gap corresponds to a positive GDP gap where actual GDP is less than potential, while an inflationary gap corresponds to a negative GDP gap where actual GDP is greater than potential.

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Glossary

[glossary-page][glossary-term]inflationary gap:[/glossary-term][glossary-definition]when macro equilibrium occurs at a level of GDP greater than potential GDP; thus, unemployment is lower than the natural rate[/glossary-definition][glossary-term]potential GDP line:[/glossary-term]
[glossary-definition]vertical line on the Keynesian Cross diagram indicating where GDP (on the horizontal axis) is at potential[/glossary-definition]
[glossary-term]recessionary gap:[/glossary-term][glossary-definition]when macro equilibrium occurs at a level of GDP less than potential GDP; thus, unemployment is higher than the natural rate[/glossary-definition]
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10.11: Real Aggregate Supply in the Income-Expenditure Model

Learning Objectives

- Explain aggregate supply in the income-expenditure model and how the income-expenditure model correlates to the AD-AS model

We observed earlier the income-expenditure model doesn't explicitly discuss aggregate supply, but it's straightforward to add that, if we think of the aggregate supply curve as answering the question: how do producers respond to a change in aggregate demand? Recall Figure 1 below from our earlier discussion of aggregate demand in the Keynesian model. Figure 1 shows the pure Keynesian AD-AS model. Let's think about how this corresponds to the income-expenditure model.

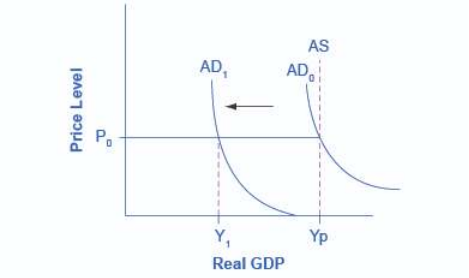


Figure 1. The Pure Keynesian AD–AS Model. The Keynesian View of the AD–AS Model uses an AS curve which is horizontal at levels of output below potential and vertical at potential output. Thus, changes in AD only affect GDP when below potential output, but only affect the price level when at potential output.

The pure Keynesian AD-AS model assumes that for any level of GDP below potential, any change in AD affects real GDP, but not the price level. This corresponds to the Keynesian Cross diagram to the left of the Potential GDP line. But to the right of the Potential GDP line, any change in AD affects the price level but not real GDP. This makes sense since potential GDP means all resources are fully employed so it's not possible to produce more output. Thus, any increase in AD can only lead to inflation. Let's redraw the Keynesian Cross diagram to illustrate this (Figure 2). E_p plays the role of aggregate demand, and the income equals expenditure line plays the role of aggregate supply. But once we reach potential GDP, AS becomes vertical, just as it does in the traditional AD-AS model shown in Figure 1.

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Figure 2 (Interactive Graph). The Real Aggregate Supply (RAS) Curve.

This version of the Keynesian Cross works exactly like the original version for changes in aggregate expenditure. But it also allows for positive and negative supply shocks which show up as shifts in real aggregate supply due to changes in resource prices, productivity, etc.

Supply Shocks

Suppose there is a positive supply shock, for example, an increase in the labor supply. A larger labor supply means the economy can produce more output, so the level of potential GDP (Yp) shifts to the right. As a result, an increase in Ep doesn't cause higher prices since the increased Yp provides room for the economy to grow. Thus, increased Ep leads to increased Y. Of course, if Ep increases enough, the economy would pass Yp and the increased spending would cause inflation, but no additional real GDP.

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10.12: Introduction to the Expenditure Multiplier in the Income-Expenditure Model

What you'll learn to do: explain why the expenditure multiplier happens and how to calculate its size



Figure 1. Citizens march against government budget cuts.

Recall that a major finding of Keynesian economics is that spending is powerful. Not only does GDP change when aggregate expenditure changes, but GDP changes more than proportionately, so that a smaller change in expenditure causes a larger change in GDP. In this section, you'll explore the multiplier effect using logic, graphs and algebra. You'll also learn what makes the multiplier effect larger or smaller and how to compute that using the income-expenditure model.

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- Half a million marching against the cuts. At least one person remembered the methods that worked before.. **Authored by**: Gwydion M. Williams. **Provided by**: flickr. **Located at**: https://www.flickr.com/photos/45909111@N00/5582229535/in/photostream/. **License**: *CC BY-SA: Attribution-ShareAlike*

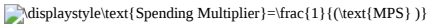
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10.13: The Spending Multiplier in the Income-Expenditure Model

Learning Objectives

- Explain and demonstrate the multiplier graphically using the income-expenditure model

In our initial discussion of Keynesian economics in the module on Keynesian and neoclassical economics, you learned about the spending (or expenditure) multiplier. Remember that a change in any category of expenditure (C + I + G + X-M) can have a more than proportional impact on GDP. The idea behind the multiplier is that the change in GDP is more than the change in expenditure. In its simplest form, the calculation for this is



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Showing the Spending Multiplier Graphically Using the Income-Expenditure Model

We can show the expenditure multiplier graphically using the income-expenditure model. The original level of aggregate expenditure is shown by the AE_0 line and yields an equilibrium level of GDP at Y_0. Consider an increase in AE to AE_1, which is shown by a parallel shift in the AE line. This could be caused by an increase in autonomous consumption, investment, government spending or net exports. The vertical distance between the two AE lines is the increase in aggregate expenditure. The new equilibrium level of GDP occurs at Y_1. It should be clear that the increase in GDP from Y_0 to Y_1 is greater than the increase in expenditure from AE_0 to AE_1.

The spending multiplier is defined as the ratio of the change in GDP (**Δ**Y) to the change in autonomous expenditure (**Δ**AE). Since the change in GDP is greater change in AE, the multiplier is greater than one. Suppose the equilibrium level of GDP is $700 billion. If government spending increases by $50 billion, GDP rises from is $700 billion (at Y_0) to Y_1 $800 billion (at Y_1). Thus, the change in GDP is $800 – $700 = $100 billion. In this example, the multiplier would be $100/$50 = 2.

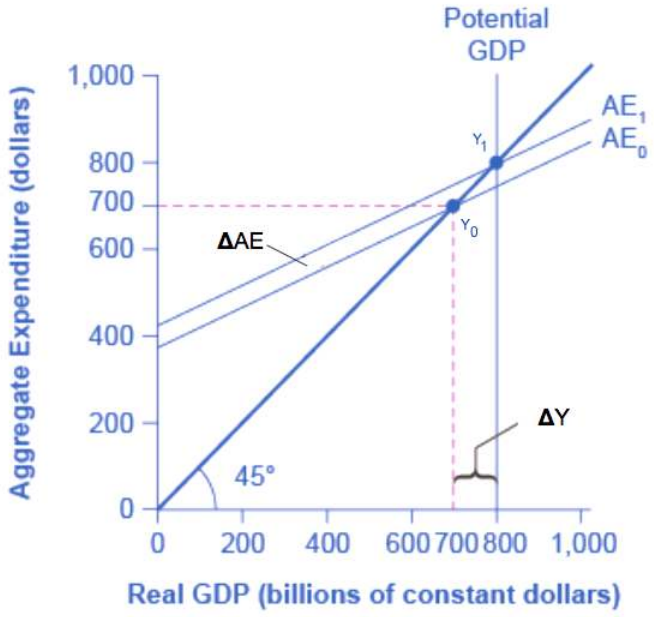


Figure 1. The Multiplier Effect in the Expenditure-Output Model. The power of the multiplier effect is that an increase in expenditure has a larger increase on the equilibrium output. The increase in expenditure is the vertical increase from AE0 to AE1. However, the increase in equilibrium output, shown on the horizontal axis, is clearly larger. Thus, the spending multiplier, ΔY/ΔAE, is greater than one.

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10.14: The Spending Multiplier and Changes in Government Spending

Learning Objectives

- Determine how government spending should change to reach equilibrium, or full employment (using the income-expenditure model)

Suppose the economy is suffering from a recessionary gap due to insufficient aggregate demand. We can use the algebra of the spending multiplier to determine how much government spending should be increased to return the economy to potential GDP where full employment occurs.

Recall that macro equilibrium in the income-expenditure model is found at the point where the level of GDP, or national income, equals aggregate expenditure. The formula for the aggregate expenditure is

$$\text{Aggregate Expenditure} = C + I + G + (X - M).$$

Finally, note that this example includes income taxes; thus, people consume out of disposable income (or take-home pay). This is shown in the consumption equation below, which deducts taxes before spending.

Exercise: Expansionary Fiscal policy

Suppose the model is given by:

Y = National income

T = Taxes = 0.3Y

C = Consumption = 200 + 0.9 (Y – T)

I = Investment = 600

G = Government spending = 1,000

X = Exports = 600

Y = Imports = 0.1 (Y – T)

Step 1. Calculate the initial equilibrium for this economy (where Y = AE).

Y	=	200 + 0.9(Y – 0.3Y) + 600 + 1000 + 600 – 0.1(Y – 0.3Y)
Y – 0.63Y + 0.07Y	=	2400
0.44Y	=	2400
Y	=	5454

Step 2. Assume that the full employment level of output is 6,000. What level of government spending would be necessary to reach that level? Since initial output is 5,454, GDP needs to be increased by 6,000 – 5,454 = 556. What increase in government spending (while incorporating the spending multiplier) will achieve this?

To answer this question, plug in 6,000 as equal to Y, but leave G as a variable, and solve for G. Thus:

$$6000 = 200 + 0.9(6000 - 0.3(6000)) + 600 + G + 600 - 0.1(6000 - 0.3(6000))$$

Step 3. Solve this problem arithmetically. The answer is: G = 1,240. In other words, increasing government spending by 240, from its original level of 1,000, to 1,240, would raise output to the full employment level of GDP.

Thus a Keynesian expansionary fiscal policy, increasing government spending by 240, would correct the recessionary gap in this example.

Watch It

Watch the following video for a similar example.

An interactive or media element has been excluded from this version of the text. You can view it online here: http://pb.libretexts.org/mlum/?p=459

Try It

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10.15: Putting It Together- The Income-Expenditure Model

In this module we examined Keynesian economics in more detail using the Income-Expenditure Model. This model was the original graphical representation of Keynesian economics, and while not as widely used as the AD-AS model, it has several advantages over the latter. These include:



- It fleshes out the components of aggregate demand (or total expenditure) than can be done with the AD-AS model
- It provides a more intuitive, algebraic approach for determining macroeconomic equilibrium and analyzing shocks to macro equilibrium
- It allows for a better graphical and algebraic understanding of the expenditure model.

At the beginning of this module, we asked, “What caused the Great Recession of 2007-2008 and why was it so serious?” The answer comes directly from the Income-Expenditure model. The recession was the result of a collapse in the housing market, which lead to large decline in investment expenditures beginning with investment in residential structures. The recession proved to be so serious, because of the large decrease in investment expenditure combined with the cumulative effects of the expenditure multiplier. GDP didn’t just fall; it fell by several times the decrease in investment expenditure.

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10.16: Discussion- The Income-Expenditure Model

Respond to the following prompts in a post with a minimum of 250 words, then comment on at least TWO other posts.

During the period of the “Great Moderation” (the mid-1980s through the mid-2000s), discussion of the Keynesian expenditure multiplier had largely gone out of fashion. After all, if business cycles were largely tamed, the effects of a significant demand shock seemed irrelevant. When the Great Recession hit at the end of 2007, the expenditure multiplier became a hot topic again for discussion among macroeconomists.

- Why does the size of the expenditure multiplier matter in the real world? Why does it matter to businesses, employees, consumers and policy makers?
- Based on what you know about the multiplier, do you think the government took the appropriate response to the Great Recession? Was the fiscal stimulus response to the recession enough, just right, or too much? What evidence can you provide for your conclusion? Find a news article (and include the link in your response) to support your opinion.

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10.17: Assignment- The Income-Expenditure Model

Suppose the economy is operating at potential GDP, something like was the case for the U.S. in mid-2018. The unemployment rate has reached historic lows, suggesting that the economy is at full employment. Now suppose that due to an economic slowdown in Europe, U.S. export sales decline. Use the income-expenditure model to analyze the impact this decrease in export expenditures will have on U.S. GDP and employment. Show graphically and explain your economic reasoning.

To make this more concrete, here are some specific numbers to work with. Suppose potential GDP occurs where Y = $10,000 billion. Suppose that the marginal propensity to consume is 0.75. If we assume that both taxes and imports are given then the simple expenditure multiplier formula applies. Suppose exports fall by $100 billion. Use the multiplier formula to estimate the change in GDP. Suppose further that for every one percentage point that GDP falls below potential, the unemployment rate will rise by half of one percentage point. How much then will the unemployment rate rise due to the decrease in exports?

Rubric

Criteria	Not Evident	Developing	Proficient	Distinguished	Weight
Use the income-expenditure model to analyze this problem graphically, showing the initial and final equilibrium points. Label appropriately.					4
Correctly explain the economic reasoning about what happens to GDP and employment, and most importantly, why.					4
Use the simple expenditure multiplier formula to correctly compute the change in GDP.					4
Converting the change in GDP to percent, use the information provided to estimate the effect of the change in GDP on the unemployment rate (in percent).					4
Write up your analysis using correct language, explaining all your work					4
					Total: 20

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10.18: Assignment- Problem Set — The Income-Expenditure Model

Click on the following link to download the problem set for this module:

- The Income-Expenditure Problem Set

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CHAPTER OVERVIEW

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11.2: Introduction to Budgets and Taxes
11.3: Fiscal Policy and the Federal Budget
11.4: Government Spending
11.5: State and Local Government Spending
11.6: Taxation
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11.9: Introduction to Fiscal Policy in Action
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11.11: Expansionary and Contractionary Fiscal Policy
11.12: Learn By Doing- Expansionary and Contractionary Fiscal Policy
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11.16: Putting It Together- Fiscal Policy
11.17: Discussion- Fiscal Policy
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11.1: Why It Matters- Fiscal Policy

Why describe the uses and implications of fiscal policy?



Figure 1. The budget is the financial representation of the priorities of the government, reflecting historical debates and competing economic philosophies.

This module has great practical knowledge for you. This is not primarily because it's important for the course, though it is. Rather, this model presents information that every citizen (or at least every voter) should know. The topic of the module is how government budgets affect the economy. The material is divided into two categories: first, understanding government budgets at the federal, state and local levels, and second, learning how government spending and taxes affect different parts of the economy as well as the economy as a whole. You'll consider questions like:

- People often complain about taxes, but what proportion of tax revenue comes from individuals, what proportion comes from corporations, and what proportion comes from foreigners? What proportion of tax revenue is based on income?



Figure 2. 1040 & Schedule D.

- What proportion is based on property?
- What proportion is based on our purchases?
- What does government spend our tax dollars on?
- How much of the federal budget is spent on "welfare" type expenditures?
- How much is spent on foreign aid?
- How much is spent making payments on the national debt?
- What do states and local areas spend their budgets on?
- What is the difference between the federal deficit and the public or national debt?
- Are tax cuts good or bad for the economy? In what ways are they good or bad?
- Is government spending good or bad for the economy? Is all government spending the same in this respect?

These are questions that are relevant every time we have an election, whether it is at the national, state or local levels. These are also questions that most Americans can't answer correctly. How can you vote intelligently if you can't accurately evaluate the candidate's positions on government budgets? This module will help you become a more intelligent voter.









Figure 3. Government Spending Collage. Tomb of the Unknown Soldier by Tony Fischer, CC-BY. Social Security Card by Donkeyhotey, CC-BY. Old Style Food Stamps by chrstphre campbell, CC-BY. WIC by Capital Area Food Bank of Texas, CC-BY-ND.

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11.2: Introduction to Budgets and Taxes

What you'll learn to do: identify the major spending categories and major revenue sources in the U.S. Federal budget



Figure 1.Shut Downs and Parks. Yellowstone National Park is one of the many national parks forced to close down during the government shut down in October 2013. (Credit: modification of work by daveynin, CC BY).

Imagine you had trekked all the way to see Yellowstone National Park in the beautiful month of October 2013, only to find it… closed. Closed! Why?

For two weeks in October 2013, the U.S. federal government shut down. Many federal services, like the national parks, closed and 800,000 federal employees were furloughed. Tourists were shocked and so was the rest of the world: congress and the president could not agree on a budget. Inside the Capitol, republicans and democrats argued about spending priorities and whether to increase the national debt limit. Each year's budget, which is over $3 trillion of spending, must be approved by Congress and signed by the President. Tied to the budget debate was the issue of increasing the debt ceiling—how high the national debt of the U.S. government can be. The House of Representatives refused to sign on to the bills to fund the government unless they included provisions to stop or change the Affordable Health Care Act (more colloquially known as Obamacare). As the days ticked by, the United States came very close to defaulting on its debt. Another shorter government shutdown occurred more recently in January 2018, as legislators debated the budget alongside things like immigration and the Deferred Action for Childhood Arrivals (DACA) policy.

Why does the federal budget create such intense debates? What would happen if the United States actually defaulted on its debt? In this section, you will take a look at where the government obtains its revenue and how the money is spent, so that we can better understand the entire federal budget and fiscal policy.

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11.3: Fiscal Policy and the Federal Budget

Learning Objectives

- Define and give examples of fiscal policy

Fiscal Policy

In this module we will dive into fiscal policy. Fiscal policy is one of two policy tools for managing the economy (the other is monetary policy). While monetary policy is conducted by policymakers at the Federal Reserve, fiscal policy is decided by Congress and the President.

All levels of government—federal, state, and local—have budgets that show how much revenue the government expects to receive in taxes and other income and how the government plans to spend it. Indeed, examining government budgets are a quick way to get a sense of the role of government in the economy. Budgets, however, can shift dramatically within a few years, as policy decisions and unexpected events shake up earlier tax and spending plans.

The discussion of fiscal policy focuses on how federal government taxing and spending affects aggregate demand. All government spending and taxes affect the economy, but fiscal policy focuses strictly on the policies of the federal government. We will begin with an overview of U.S. government spending and taxes. Then we'll discuss fiscal policy from a short-run perspective; that is, how government uses tax and spending policies to address recession, unemployment, and inflation; how periods of recession and growth affect government budgets; and the merits of balanced budget proposals.

Watch It

Watch this video for an explanation of fiscal policy. This provides an overview on ways that fiscal policies are implemented, which we will examine in more detail later in the module.

A link to an interactive elements can be found at the bottom of this page.

Try It

https://assessments.lumenlearning.co...sessments/7580

Learning Objectives

[glossary-page][glossary-term]fiscal policy:[/glossary-term]
[glossary-definition]changes in Federal government spending or tax rates for the purpose of influencing the macroeconomy.[/glossary-definition]
[/glossary-page]

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11.4: Government Spending

Learning Objectives

- Describe the federal budget and identify deficit and surplus trends over the past five decades

Total U.S. Government Spending

Government spending covers a range of services provided by the federal, state, and local governments. When the federal government spends more money than it receives in taxes in a given year, it runs a **budget deficit**. Conversely, when the government receives more money in taxes than it spends in a year, it runs a **budget surplus**. If government spending and taxes are equal, it is said to have a **balanced budget**. For example, in 2009, the U.S. government experienced its largest budget deficit ever, as the federal government spent $1.4 trillion more than it collected in taxes. This deficit was about 10% of the size of the U.S. GDP in 2009, making it by far the largest budget deficit relative to GDP since the mammoth borrowing used to finance World War II.

Federal spending in nominal dollars (that is, dollars not adjusted for inflation) has grown by a multiple of more than 38 over the last four decades, from $92 billion in 1960 to $3.9 trillion in 2014. Comparing spending over time in nominal dollars is misleading though, because it does not take into account inflation, growth in population, or growth in the real economy. A more useful method of comparison is to examine government spending as a percent of GDP over time.

The top line in Figure 1 shows the level of federal spending since 1960, expressed as a share of GDP. Despite a widespread sense among many Americans that the federal government has been growing steadily larger, the graph shows that federal spending has hovered in a range from 18% to 22% of GDP most of the time since 1960. The other lines in Figure 1 show the major federal spending categories: national defense, Social Security, health programs, and interest payments. From the graph, we see that national defense spending as a share of GDP has generally declined since the 1960s, although there were some upward bumps in the 1980s buildup under President Ronald Reagan and in the aftermath of the terrorist attacks on September 11, 2001. In contrast, Social Security and healthcare have grown steadily as a percent of GDP. Healthcare expenditures include both payments for senior citizens (Medicare), and payments for low-income Americans (Medicaid). Medicaid is also partially funded by state governments. Interest payments are the final main category of government spending shown in the figure.

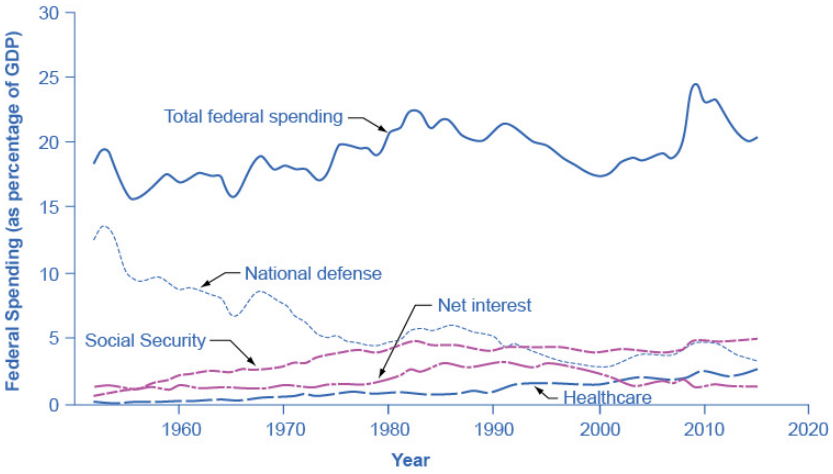


Figure 1.Federal Spending. Since 1960, total federal spending has ranged from about 18% to 22% of GDP, although it climbed above that level in 2009, but quickly dropped back down to that level by 2013. The share that the government has spent on national defense has generally declined, while the share it has spent on Social Security and on healthcare expenses (mainly Medicare and Medicaid) has increased. (Source: Economic Report of the President, Tables B-2 and B-22, http://www.gpo.gov/fdsys/pkg/ERP-201...nt-detail.html)

These four categories—national defense, Social Security, healthcare, and interest payments—account for roughly 71% of all federal spending, as Figure 2 shows. The remaining 29% wedge of the pie chart covers all other categories of federal government spending: international affairs; science and technology; natural resources and the environment; transportation; housing; education; income support for the poor; community and regional development; law enforcement and the judicial system; and the administrative costs of running the government.

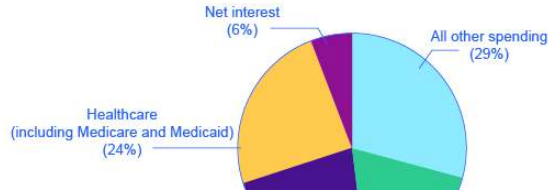




Figure 2. Slices of Federal Spending, 2014. About 73% of government spending goes to four major areas: national defense, Social Security, healthcare, and interest payments on past borrowing. This leaves about 29% of federal spending for all other functions of the U.S. government. (Source: https://www.whitehouse.gov/omb/budget/Historicals/)

Try It

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Each year the government runs a budget deficit, it finances the deficit by borrowing funds from U.S. citizens and foreigners. It does this by selling securities (Treasury bonds, notes, and bills)—in essence borrowing from the public and promising to repay with interest in the future. From 1961 to 1997, the U.S. government has run budget deficits, and thus borrowed funds, in almost every year. It had budget surpluses from 1998 to 2001, and then returned to deficits since then.

The interest payments on past federal government borrowing were typically 1–2% of GDP in the 1960s and 1970s but then climbed above 3% of GDP in the 1980s and stayed there until the late 1990s. The government was able to repay some of its past borrowing by running surpluses from 1998 to 2001 and, with help from low interest rates, the interest payments on past federal government borrowing had fallen back to 1.4% of GDP by 2012.

LINK IT UP

Does the federal government spend too much? Use this budget simulator to see if you can reduce government outlays.

Try It

These questions allow you to get as much practice as you need, as you can click the link at the top of the first question ("Try another version of these questions") to get a new set of questions. Practice until you feel comfortable doing the questions.

[ohm_question]153251-153252-153253[/ohm_question]

Learning Objectives

[glossary-page]
[glossary-term]balanced budget: [/glossary-term]
[glossary-definition]when government spending and taxes are equal[/glossary-definition][glossary-term]budget deficit:[/glossary-term]
[glossary-definition]when the federal government spends more money than it receives in taxes in a given year[/glossary-definition]
[glossary-term]budget surplus: [/glossary-term]
[glossary-definition]when the government receives more money in taxes than it spends in a year[/glossary-definition]
[/glossary-page]

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11.5: State and Local Government Spending

Learning Objectives

- Describe state and local government spending, including main expenses

Although federal government spending often gets most of the media attention, state and local government spending is also substantial—at about $3.1 trillion in 2014. Figure 1 shows that state and local government spending has increased during the last four decades from around 8% to around 14% today. The single biggest item is education, which accounts for about one-third of the total. The rest covers programs like highways, libraries, hospitals and healthcare, parks, and police and fire protection. Unlike the federal government, all states (except Vermont) have balanced budget laws, which means any gaps between revenues and spending must be closed by higher taxes, lower spending, drawing down their previous savings, or some combination of all of these.

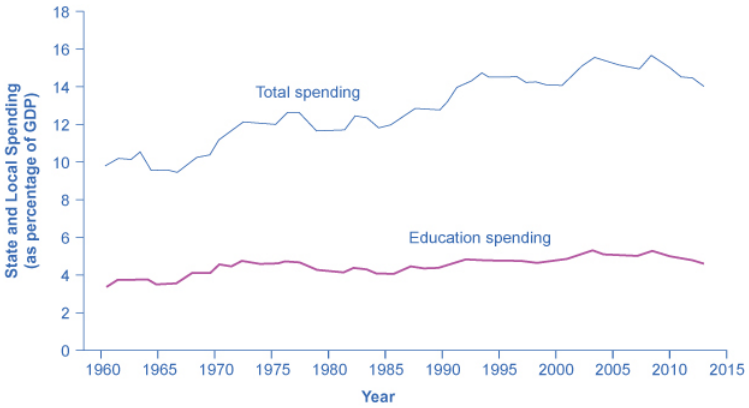


Figure 1. Spending by state and local government increased from about 10% of GDP in the early 1960s to 14–16% by the mid-1970s. It has remained at roughly that level since. The single biggest spending item is education, including both K–12 spending and support for public colleges and universities, which has been about 4–5% of GDP in recent decades. Source: (Source: Bureau of Economic Analysis.)

U.S. presidential candidates often run for office pledging to improve the public schools or to get tough on crime. However, in the U.S. system of government, these tasks are primarily the responsibilities of state and local governments. Indeed, in fiscal year 2014 state and local governments spent about $840 billion per year on education (including K–12 and college and university education), compared to only $100 billion by the federal government, according to usgovernmentspending.com. In other words, about 90 cents of every dollar spent on education happens at the state and local level. A politician who really wants hands-on responsibility for reforming education or reducing crime might do better to run for mayor of a large city or for state governor rather than for president of the United States.

Try It

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11.6: Taxation

Learning Objectives

- Identify the major sources of revenue for the U.S. federal budget as well as state and local governments
- Differentiate among a regressive tax, a proportional tax, and a progressive tax

Federal Taxes

Just as many Americans erroneously think that federal spending has grown considerably, many also believe that taxes have increased substantially. The top line of Figure 1 shows total federal taxes as a share of GDP since 1960. Although the line rises and falls, it typically remains within the range of 17% to 20% of GDP, except for 2009, when taxes fell substantially below this level, due to recession.

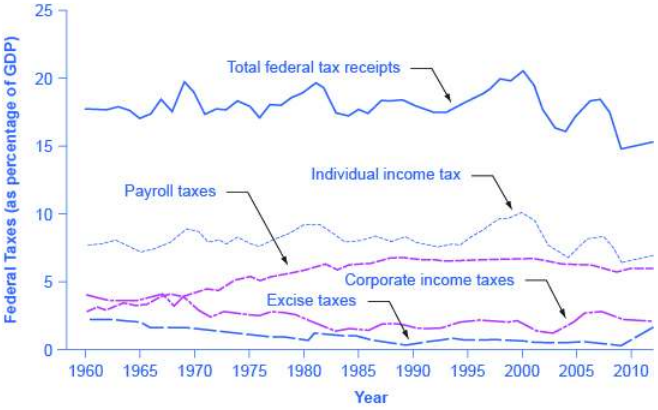


Figure 1. Federal tax revenues have been about 17–20% of GDP during most periods in recent decades. The primary sources of federal taxes are individual income taxes and the payroll taxes that finance Social Security and Medicare. Corporate income taxes and social insurance taxes provide smaller shares of revenue. (Source: Economic Report of the President, 2015. Table B-21, https://www.whitehouse.gov/administr...President/2015)

Figure 1 also shows the patterns of taxation for the main categories of taxes levied by the federal government: personal income taxes, payroll taxes, corporate income taxes, and excise taxes. When most people think of taxes levied by the federal government, the first tax that comes to mind is the **individual income tax** that is due every year on April 15 (or the first business day after). The personal income tax is the largest single source of federal government revenue, but it still represents less than half of federal tax revenue.

The second largest source of federal revenue is the **payroll tax**, which provides funds for Social Security and Medicare. Payroll taxes have increased steadily over time. Together, the personal income tax and the payroll tax accounted for about 84% of federal tax revenues in 2012. Although personal income tax revenues account for more total revenue than the payroll tax, nearly three-quarters of households pay more in payroll taxes than in income taxes.

Taxes can be described as progressive, proportional or regressive depending on how the marginal tax rate one pays changes at different income levels, as described in the feature below. Marginal tax rates are closely related to the concept of **tax brackets**.

The income tax is designed to be a **progressive tax,** which means that the marginal tax rate increases as a household's income increases. As your income rises, you move into a higher tax bracket, which means you pay a higher rate on that additional income. Taxes also vary with marital status, family size, and other factors. Progressive taxes are justified by the **ability to pay principle**, which argues that citizens with more income or wealth should pay at a higher rate since they have a greater ability to pay. Contrast this with the **benefit principle**, which argues that tax payers should pay in proportion to the benefit they receive from public goods or services. Thus, if you receive the same benefit, you should pay the same tax.

The **marginal tax rate** (the tax rate that one pays on the highest income they earn) for a single taxpayer range from 10% to 37%, depending on income, as the following feature explains.

HOW DOES THE MARGINAL Tax RATE WORK?

Suppose that a single taxpayer's income is $35,000 per year. Also suppose that income from $0 to $9,075 is taxed at 10%, income from $9,075 to $36,900 is taxed at 15%, and, finally, income from $36,900 and beyond is taxed at 25%. Since this person earns $35,000, their marginal tax rate is 15%.

The key fact here is that the federal income tax is designed so that tax rates increase as income increases, up to a certain level.

The payroll taxes that support Social Security and Medicare are designed in a different way. First, the payroll taxes for Social Security are imposed at a rate of 12.4% up to a certain wage limit, set at $117,900 in 2014. Medicare, on the other hand, pays for elderly healthcare, and is fixed at 2.9%, with no upper ceiling. In both cases, the employer and the employee split the payroll taxes. An employee only sees 6.2% deducted from his paycheck for Social Security, and 1.45% from Medicare. However, as economists are quick to point out, the employer's half of the taxes are probably passed along to the employees in the form of lower wages, so in reality, the worker pays all of the payroll taxes.

The Medicare payroll tax is described as a **proportional tax**; that is, a flat percentage of all wages earned. A **flat tax** is a proposal that the federal income tax system be proportional, so that instead of tax brackets, everyone would pay the same percentage of their income.

The Social Security payroll tax is proportional up to the wage limit, but above that level it becomes a **regressive tax**, meaning that people with higher incomes pay a smaller share of their income in tax.

Try It

Taxes can be categorized as progressive, proportional or regressive based on how their marginal tax rate changes as income goes up.

- A tax is **progressive** if you pay a higher marginal tax rate as your income rises.
- A tax is **proportional** if your tax rate doesn't change as your income rises; i.e. you pay the same rate at every income level.
- A tax is **regressive** if you pay a lower marginal tax rate as your income rises.

Try It

https://assessments.lumenlearning.co...sessments/7584

The third-largest source of federal tax revenue, as shown in Figure 1 is the **corporate income tax**. The common name for corporate income is "profits." Over time, corporate income tax receipts have declined as a share of GDP, from about 4% in the 1960s to an average of 1% to 2% of GDP in the first decade of the 2000s.

The federal government has a few other, smaller sources of revenue. It imposes an **excise tax**—that is, a tax on a particular good—on gasoline, tobacco, and alcohol. As a share of GDP, the amount collected by these taxes has stayed nearly constant over time, from about 2% of GDP in the 1960s to roughly 3% by 2012, according to the nonpartisan Congressional Budget Office. The government also imposes an **estate and gift tax** on people who pass large amounts of assets to the next generation—either after death or during life in the form of gifts. These estate and gift taxes collected about 0.2% of GDP in the first decade of the 2000s. Other federal taxes, which are also relatively small in magnitude, include tariffs collected on imported goods and charges for inspections of goods entering the country.

State and Local Taxes

The main revenue sources for state and local governments are sales taxes, property taxes, and revenue passed along from the federal government, but many state and local governments also levy personal and corporate income taxes, as well as impose a wide variety of fees and charges. **Property taxes** are taxes based on the value of your home or other real estate. State or local authorities assess the value of your real estate. Property taxes are a percentage of that value. **Sales taxes** are taxes on (and a percentage of) retail purchases. Sales taxes are known to be regressive since the lower one's income the greater proportion of the income one pays in sales tax. For this reason, some states exclude purchases of groceries and/or medications from sales tax.

The specific sources of tax revenue vary widely across state and local governments. Some states rely more on property taxes, some on sales taxes, some on income taxes, and some more on revenues from the federal government.

Figure 2 illustrates state and local taxes as a share of GDP.

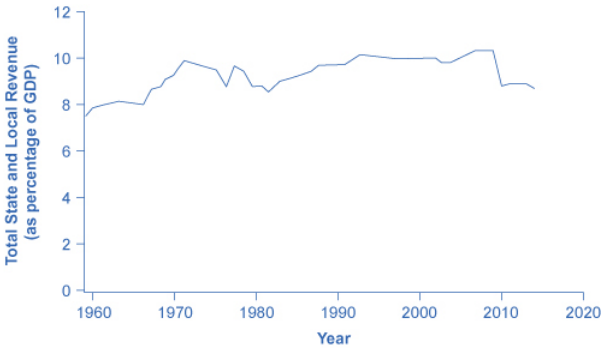


Figure 2. State and local tax revenues have increased slightly to match the rise in state and local spending. (Source: Economic Report of the President, 2015. Table B-21, https://www.whitehouse.gov/administr...President/2015)

Try It

https://assessments.lumenlearning.co...sessments/7583

Watch It

Watch this video to see examples of the various types of taxes and to learn about the importance taxes play in generating revenue for a country.

A link to an interactive elements can be found at the bottom of this page.

Try It

These questions allow you to get as much practice as you need, as you can click the link at the top of the first question ("Try another version of these questions") to get a new set of questions. Practice until you feel comfortable doing the questions.

[ohm_question]153255-153256[/ohm_question]

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11.7: Federal Budgets and National Debt

Learning Objectives

- Differentiate between deficit and debt
- Explain how economic growth or decline can influence a budget surplus or budget deficit

Having discussed the revenue (taxes) and expense (spending) side of the budget, we now turn to the annual budget deficit or surplus, which is the difference between the tax revenue collected and spending over a fiscal year, which starts October 1 and ends September 30 of the next year.

Figure 1 shows the pattern of annual federal budget deficits and surpluses, back to 1930, as a share of GDP. When the line is above the horizontal axis, the budget is in surplus. When the line is below the horizontal axis, a budget deficit occurred. Clearly, the biggest deficits as a share of GDP during this time were incurred to finance World War II. Deficits were also large during the 1930s, the 1980s, the early 1990s, and most recently during the 2008-2009 recession.

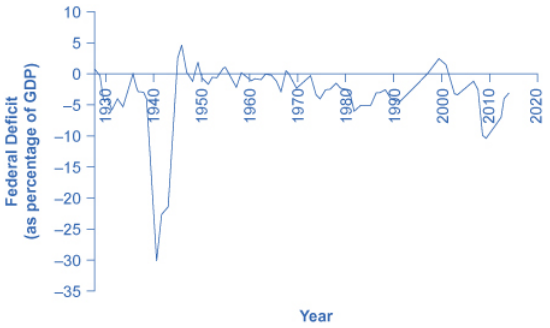


Figure 1.Pattern of Federal Budget Deficits and Surpluses, 1929–2014. The federal government has run budget deficits for decades. The budget was briefly in surplus in the late 1990s, before heading into deficit again in the first decade of the 2000s—and especially deep deficits in the 2008-2009 recession. (Source: Federal Reserve Bank of St. Louis (FRED). http://research.stlouisfed.org/fred2...es/FYFSGDA188S).

Debt/GDP Ratio

Another useful way to view the budget deficit is through the prism of accumulated debt rather than annual deficits. The **national debt** refers to the total amount that the government has borrowed over time. In contrast, the budget deficit refers to how much the government has borrowed in one particular year. Figure 2 shows the ratio of debt/GDP since 1940. Until the 1970s, the debt/GDP ratio revealed a fairly clear pattern of federal borrowing. The government ran up large deficits and raised the debt/GDP ratio in World War II, but from the 1950s to the 1970s the government ran either surpluses or relatively small deficits, and so the debt/GDP ratio drifted down. Large deficits in the 1980s and early 1990s caused the ratio to rise sharply. When budget surpluses arrived from 1998 to 2001, the debt/GDP ratio declined substantially. The budget deficits starting in 2002 then tugged the debt/GDP ratio higher —with a big jump when the recession took hold in 2008–2009.

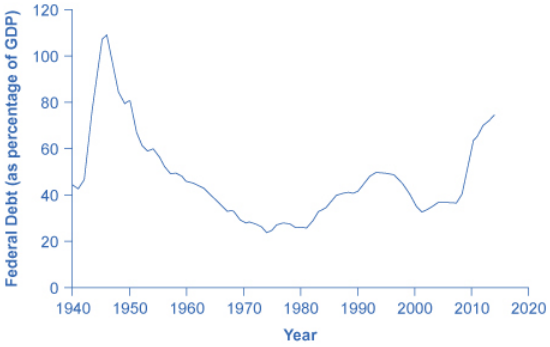


Figure 2. Federal Debt as a Percentage of GDP, 1942–2014. Federal debt is the sum of annual budget deficits and surpluses. Annual deficits do not always mean that the

debt/GDP ratio is rising. During the 1960s and 1970s, the government often ran small deficits, but since the debt was growing more slowly than the economy, the debt/GDP ratio was declining over this time. In the 2008–2009 recession, the debt/GDP ratio rose sharply. (Source: Economic Report of the President, Table B-20, http://www.gpo.gov/fdsys/pkg/ERP-201...nt-detail.html)

Try It

The deficit is not the debt. The difference between the deficit and the debt lies in the time frame. The federal deficit (or surplus) refers to what happens with the federal government budget each year. The public (or Federal government) debt is accumulated over time; it is the sum of all past deficits and surpluses. If you borrow $10,000 per year for each of the four years of college, you might say that your annual deficit was $10,000, but your accumulated debt over the four years is $40,000.

One year's federal budget deficit causes the federal government to sell Treasury bonds to make up the difference between spending programs and tax revenues. The dollar value of all the outstanding Treasury bonds on which the federal government owes money is equal to the national debt.

Try It

https://assessments.lumenlearning.co...sessments/7585

The Path from Deficits to Surpluses to Deficits

Why did the budget deficits suddenly turn to surpluses from 1998 to 2001 and why did the surpluses return to deficits in 2002? Why did the deficit become so large after 2007? Figure 3 suggests some answers. The graph combines the earlier information on total federal spending and taxes in a single graph, but focuses on the federal budget since 1990.

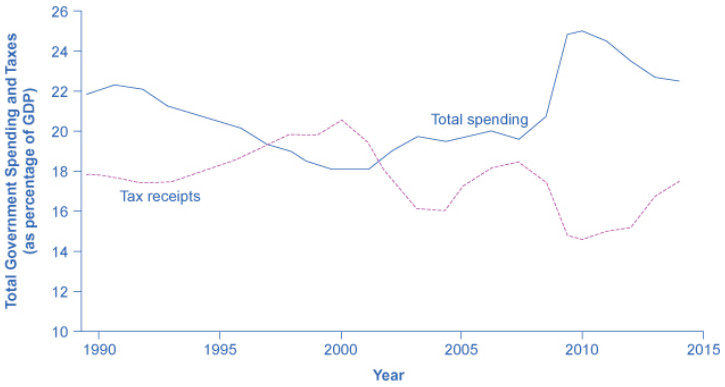


Figure 3. Total Government Spending and Taxes as a Share of GDP, 1990–2014. When government spending exceeds taxes, the gap is the budget deficit. When taxes exceed spending, the gap is a budget surplus. The recessionary period starting in late 2007 saw higher spending and lower taxes, combining to create a large deficit in 2009. (Source: Economic Report of the President, Tables B-21 and B-1,"http://www.gpo.gov/fdsys/pkg/ERP-201...nt-detail.html)

Government spending as a share of GDP declined steadily through the 1990s. The biggest single reason was that defense spending declined from 5.2% of GDP in 1990 to 3.0% in 2000, but interest payments by the federal government also fell by about 1.0% of GDP. However, federal tax collections increased substantially in the later 1990s, jumping from 18.1% of GDP in 1994 to 20.8% in 2000. Powerful economic growth in the late 1990s fueled the boom in taxes. Personal income taxes rise as income goes up; payroll taxes rise as jobs and payrolls go up; corporate income taxes rise as profits go up. At the same time, government spending on transfer payments such as unemployment benefits, foods stamps, and welfare declined with more people working.

This sharp increase in tax revenues and decrease in expenditures on transfer payments was largely unexpected even by experienced budget analysts, and so budget surpluses came as a surprise. However, in the early 2000s, many of these factors started running in reverse. Tax revenues sagged, due largely to the recession that started in March 2001, which reduced revenues. Congress enacted a series of tax cuts and President George W. Bush signed them into law, starting in 2001. In addition, government spending swelled due to increases in defense, healthcare, education, Social Security, and support programs for those who were hurt by the recession

and the slow growth that followed. Deficits returned. When the severe recession hit in late 2007, spending climbed and tax collections fell to historically unusual levels, resulting in enormous deficits.

Try It

https://assessments.lumenlearning.co...sessments/7586

Longer-term U.S. budget forecasts, a decade or more into the future, predict enormous deficits. The higher deficits during the 2008-2009 recession have repercussions, and the demographics will be challenging. The primary reason is the “baby boom”—the exceptionally high birthrates that began in 1946, right after World War II, and lasted for about two decades. Starting in 2010, the front edge of the baby boom generation began to reach age 65, and in the next two decades, the proportion of Americans over the age of 65 will increase substantially. The current level of the payroll taxes that support Social Security and Medicare will fall well short of the projected expenses of these programs, as the following Clear It Up feature shows; thus, the forecast is for large budget deficits. A decision to collect more revenue to support these programs or to decrease benefit levels would alter this long-term forecast.

Try It

In 1946, just one in every thirteen Americans was over age 65. By 2000, it was one in eight. By 2030, one American in five will be over age 65. Two enormous U.S. federal programs focus on the elderly—Social Security and Medicare. The growing numbers of elderly Americans will increase spending on these programs, as well as on Medicaid. The current payroll tax levied on workers, which supports all of Social Security and the hospitalization insurance part of Medicare, will not be enough to cover the expected costs, so what are the options?

Long-term projections from the Congressional Budget Office in 2009 are that Medicare and Social Security spending combined will rise from 8.3% of GDP in 2009 to about 13% by 2035 and about 20% in 2080. If this rise in spending occurs, without any corresponding rise in tax collections, then some mix of changes must occur: (1) taxes will need to increase dramatically; (2) other spending will need to be cut dramatically; (3) the retirement age and/or age receiving Medicare benefits will need to increase, or (4) the federal government will need to run extremely large budget deficits.

Some proposals suggest removing the cap on wages subject to the payroll tax, so that those with very high incomes would have to pay the tax on the entire amount of their wages. Other proposals suggest moving Social Security and Medicare from systems in which workers pay for retirees toward programs that set up accounts where workers save funds over their lifetimes and then draw out after retirement to pay for healthcare.

The United States is not alone in this problem. Providing the promised level of retirement and health benefits to a growing proportion of elderly with a falling proportion of workers is an even more severe problem in many European nations and in Japan. How to pay promised levels of benefits to the elderly will be a difficult public policy decision.

Watch it

Review these concepts and learn about the differences between deficit and debt in the following video.

A link to an interactive elements can be found at the bottom of this page.

Try It

This question allow you to get as much practice as you need, as you can click the link at the top of the question (“Try another version of this question”) to get a new version of the question. Practice until you feel comfortable doing the question.

[ohm_question]153254[/ohm_question]

Learning Objectives

[glossary-page]
[glossary-term]national debt: [/glossary-term]
[glossary-definition]the total accumulated amount the government has borrowed, over time, and not yet paid back[/glossary-

definition]
[/glossary-page]

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11.8: The Question of a Balanced Budget

Learning Objectives

- Describe the arguments for and against requiring the U.S. federal budget to be balanced

For many decades, going back to the 1930s, various legislators have put forward proposals to require that the U.S. government balance its budget every year. In 1995, a proposed constitutional amendment that would require a balanced budget passed the U.S. House of Representatives by a wide margin, and failed in the U.S. Senate by only a single vote. (For the balanced budget to have become an amendment to the Constitution would have required a two-thirds vote by Congress and passage by three-quarters of the state legislatures.)



Figure 1. While a balanced budget makes sense for an individual or household, it is more nuanced at a national level.

Most economists view the proposals for a perpetually balanced budget with bemusement. After all, in the short term, economists would expect the budget deficits and surpluses to fluctuate up and down with the economy and the automatic stabilizers. Economic recessions should automatically lead to larger budget deficits or smaller budget surpluses, while economic booms lead to smaller deficits or larger surpluses. A requirement that the budget be balanced each and every year would prevent these automatic stabilizers from working and would worsen the severity of economic fluctuations.

Some supporters of the balanced budget amendment like to argue that, since households must balance their own budgets, the government should too. However, this analogy between household and government behavior is severely flawed. Most households do not balance their budgets every year. Some years households borrow to buy houses or cars or to pay for medical expenses or college tuition. Other years they repay loans and save funds in retirement accounts. After retirement, they withdraw and spend those savings. Also, the government is not a household for many reasons, one of which is that the government has macroeconomic responsibilities. The argument of Keynesian macroeconomic policy is that the government needs to lean against the wind, spending when times are hard and saving when times are good, for the sake of the overall economy.

There is also no particular reason to expect a government budget to be balanced in the medium term of a few years. For example, a government may decide that by running large budget deficits, it can make crucial long-term investments in human capital and physical infrastructure that will build the country's long-term productivity. These decisions may work out well or poorly, but they are not always irrational. Such policies of ongoing government budget deficits may persist for decades. As the U.S. experience from the end of World War II up to about 1980 shows, it is perfectly possible to run budget deficits almost every year for decades, but as long as the percentage increases in debt are smaller than the percentage growth of GDP, the debt/GDP ratio will decline at the same time.

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Nothing in this argument is a claim that budget deficits are always a wise policy. In the short run, a government that runs a very large budget deficit can shift aggregate demand to the right and trigger severe inflation. Additionally, governments may borrow for foolish or impractical reasons. Later when we learn about policy application in more detail, we will discuss how large budget deficits, by reducing national saving, can in certain cases reduce economic growth and even contribute to international financial

crises. A requirement that the budget be balanced in each calendar year, however, is a misguided overreaction to the fear that in some cases, budget deficits can become too large.

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11.9: Introduction to Fiscal Policy in Action

What you'll learn to do: explain fiscal policies, including automatic, expansionary, and contractionary fiscal policies



Figure 1. Lithograph showing two British workers standing outside a closed factory, with a sign on the gate denouncing foreign competition and recommending the reform of fiscal policy.

In this section, we will segue from discussing government budgets, per se, to discussing fiscal policy. Recall that fiscal policy is the use of changes in government spending and tax rates to influence the path of the macro economy. Every federal budget reflects some fiscal policy. Fiscal policy approaches range from passive to activist. In this section, you will use the AS-AD model to help you understand how governments use fiscal policies to fight against recession and inflation, and also to promote economic growth.

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11.10: Automatic Stabilizers

Learning Objectives

- Describe how fiscal policy can be designed to stabilize the economy using automatic stabilizers



Figure 1. Automatic stabilizers, like welfare programs such as food stamps, automatically kick in when aggregate demand falls.

Fiscal policies include discretionary fiscal policy and automatic stabilizers. **Discretionary fiscal policy** occurs when the Federal government passes a new law to explicitly change tax rates or spending levels. The stimulus package of 2009 is an example. Changes in tax and spending levels can also occur automatically through non-discretionary spending, due to **automatic stabilizers**, which are programs that are already in place, and thus do not require Congress to act. Instead, they prevent aggregate demand from falling as much as it otherwise would in recession, or they hold down aggregate demand in a potentially inflationary boom. Let's see how this works.

Counterbalancing Recession and Boom

Automatic stabilizers include unemployment insurance, food stamps, and the personal and corporate income tax. Suppose aggregate demand were to fall sharply so that a recession occurred. The lower level of aggregate demand and higher unemployment will tend to pull down personal incomes and corporate profits, which would tend to reduce consumer and investment spending, further cutting aggregate demand and GDP. Consider, though, the effects of automatic stabilizers. As individuals are laid-off, they qualify for unemployment compensation, food stamps and other welfare programs. Additionally, since their income has fallen, so have their tax liabilities. All of these things serve to buoy aggregate demand and prevent it from falling as far as it otherwise would. Thus, recessions are somewhat milder.

The process works in reverse, too. Consider the situation where aggregate demand has risen sharply, causing the macro equilibrium to occur at a level of output above potential GDP. Because taxes are based on personal income and corporate profits, a rise in aggregate demand automatically increases tax payments, reducing disposable income and thus spending. On the spending side, stronger aggregate demand typically means lower unemployment, so there is less need for government spending on unemployment benefits, welfare, Medicaid, and other programs in the social safety net. The combination of these automatic stabilizing effects is to prevent aggregate demand from rising as high as it otherwise would, so that inflationary pressure is dampened.

A glance back at economic history provides a second illustration of the power of automatic stabilizers. Remember that the length of economic upswings between recessions has become longer in the U.S. economy in recent decades. The three longest economic booms of the twentieth century happened in the 1960s, the 1980s, and the 1991–2001 time period. One reason why the economy has tipped into recession less frequently in recent decades is that the size of government spending and taxes has increased in the second half of the twentieth century. Thus, the automatic stabilizing effects from spending and taxes are now larger than they were in the first half of the twentieth century. Around 1900, for example, federal spending was only about 2% of GDP. In 1929, just before the Great Depression hit, government spending was still just 4% of GDP. In those earlier times, the smaller size of government made automatic stabilizers far less powerful than in the last few decades, when government spending often hovers at 20% of GDP or more.

Try It

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Watch It

This video briefly explains the difference between automatic stabilizers and discretionary government spending.

A link to an interactive elements can be found at the bottom of this page.

The Standardized Employment Deficit or Surplus

From the previous section, it should be clear that the budget deficit or surplus responds to the state of the economy. That is, the automatic stabilizers cause the budget to go into deficit (higher spending and lower tax revenues) during recessions and to go into surplus (lower spending and higher tax revenues) during booms. As a result, we can't look at the deficit figures alone to see how aggressive fiscal policy is.

Each year, the nonpartisan Congressional Budget Office (CBO) calculates the **standardized (or full) employment budget**—that is, what the budget deficit or surplus would be if the economy were producing at potential GDP. Since the automatic stabilizers are "in neutral" at potential GDP, neither boosting nor dampening aggregate demand, the standardized employment budget calculation removes the impact of the automatic stabilizers on the budget balance.

Figure 2 compares the actual budget deficits of recent decades with the CBO's standardized deficit.

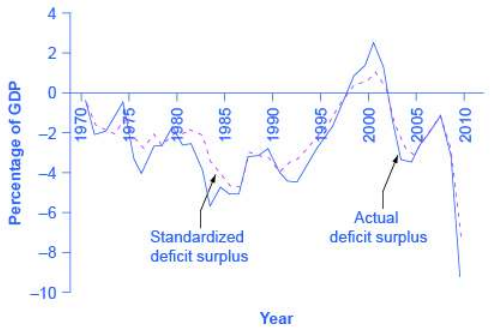


Figure 2. Comparison of Actual Budget Deficits with the Standardized Employment Deficit. When the economy is in recession, the standardized employment budget deficit is less than the actual budget deficit because the economy is below potential GDP, and the automatic stabilizers are reducing taxes and increasing spending. When the economy is performing extremely well, the standardized employment deficit (or surplus) is higher than the actual budget deficit (or surplus) because the economy is producing about potential GDP, so the automatic stabilizers are increasing taxes and reducing the need for government spending. (Sources: Actual and Cyclically Adjusted Budget Surpluses/Deficits, http://www.cbo.gov/publication/42323; and Economic Report of the President, Table B-1, http://www.gpo.gov/fdsys/pkg/ERP-201...nt-detail.html).

Notice that in recession years, like the early 1990s, 2001, or 2009, the standardized employment deficit is smaller than the actual deficit. During recessions, the automatic stabilizers tend to increase the budget deficit, so if the economy was instead at full employment, the deficit would be reduced. However, in the late 1990s the standardized employment budget surplus was lower than the actual budget surplus. The gap between the standardized budget deficit or surplus and the actual budget deficit or surplus shows the impact of the automatic stabilizers. More generally, the standardized budget figures allow you to see what the budget deficit would look like with the economy held constant—at its potential GDP level of output.

Automatic stabilizers respond to changes in the economy quickly. Lower wages means that a lower amount of taxes is withheld from paychecks right away. Higher unemployment or poverty means that government spending in those areas rises as quickly as people apply for benefits. However, while the automatic stabilizers offset part of the shifts in aggregate demand, they do not offset all or even most of it. Historically, automatic stabilizers on the tax and spending side offset about 10% of any initial movement in the level of output. This offset may not seem enormous, but it is still useful. Automatic stabilizers, like shock absorbers in a car, can be useful if they reduce the impact of the worst bumps, even if they do not eliminate the bumps altogether.

Learning Objectives

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11.11: Expansionary and Contractionary Fiscal Policy

Learning Objectives

- Explain how expansionary fiscal policy can increase aggregate demand and boost the economy
- Explain how contractionary fiscal policy can decrease aggregate demand and depress the economy

Fiscal Policy

Fiscal policy is the use of government spending and tax policy to influence the path of the economy over time. **Automatic stabilizers,** which we learned about in the last section, are a passive type of fiscal policy, since once the system is set up, Congress need not take any further action. On the other hand, **discretionary fiscal policy** is an active fiscal policy that uses expansionary or contractionary measures to speed the economy up or slow the economy down, .

Expansionary fiscal policy occurs when the Congress acts to cut tax rates or increase government spending, shifting the aggregate demand curve to the right. **Contractionary fiscal policy** occurs when Congress raises tax rates or cuts government spending, shifting aggregate demand to the left.

Figure 1 uses an aggregate demand/aggregate supply diagram to illustrate a healthy, growing economy. The original equilibrium occurs at E_0, the intersection of aggregate demand curve AD_0 and aggregate supply curve AS_0, at an output level of 200 and a price level of 90.

One year later, aggregate supply has shifted to the right to AS_1 in the process of long-term economic growth, and aggregate demand has also shifted to the right to AD_1, keeping the economy operating at the new level of potential GDP. The new equilibrium (E_1) is at an output level of 206 and a price level of 92. One more year later, aggregate supply has again shifted to the right, now to AS_2, and aggregate demand shifts right as well to AD_2. Now the equilibrium is E_2, with an output level of 212 and a price level of 94. In short, the figure shows an economy that is growing steadily year to year, producing at its potential GDP each year, with only small inflationary increases in the price level.

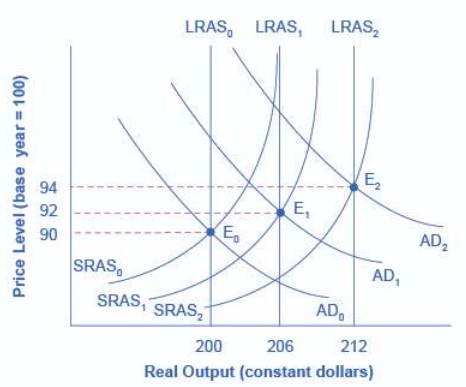


Figure 1. A Healthy, Growing Economy. In this well-functioning economy, each year aggregate supply and aggregate demand shift to the right so that the economy proceeds from equilibrium E_0 to E_1 to E_2. Each year, the economy produces at potential GDP with only a small inflationary increase in the price level. But if aggregate demand does not smoothly shift to the right and match increases in aggregate supply, growth with deflation can develop.

In the real world, however, aggregate demand and aggregate supply do not always move neatly together, especially over short periods of time. Aggregate demand may fail to grow as fast as aggregate supply, or it may even decline causing a recession. This could be caused by a number of possible reasons: households become hesitant about consuming; firms decide against investing as much; or perhaps the demand from other countries for exports diminishes. For example, investment by private firms in physical capital in the U.S. economy boomed during the late 1990s, rising from 14.1% of GDP in 1993 to 17.2% in 2000, before falling back to 15.2% by 2002. Conversely, increases in aggregate demand could run ahead of increases in aggregate supply,

causing inflationary increases in the price level. Business cycles of recession and boom are the consequence of shifts in aggregate supply and aggregate demand. As these occur, the government may choose to use fiscal policy to address the difference.

Expansionary Fiscal Policy

Expansionary fiscal policy increases the level of aggregate demand, through either increases in government spending or reductions in taxes. Expansionary policy can do this by:

1. increasing consumption by raising disposable income through cuts in personal income taxes or payroll taxes;
2. increasing investments by raising after-tax profits through cuts in business taxes; and
3. increasing government purchases through increased spending by the federal government on final goods and services and raising federal grants to state and local governments to increase their expenditures on final goods and services.

Contractionary fiscal policy does the reverse: it decreases the level of aggregate demand by decreasing consumption, decreasing investments, and decreasing government spending, either through cuts in government spending or increases in taxes. The aggregate demand/aggregate supply model is useful in judging whether expansionary or contractionary fiscal policy is appropriate.

Consider first the situation in Figure 2, which is similar to the U.S. economy during the recession in 2008–2009. The intersection of aggregate demand (AD_0) and aggregate supply (AS_0) is occurring below the level of potential GDP. At the equilibrium (E_0), a recession occurs and unemployment rises. (The figure uses the upward-sloping AS curve associated with a Keynesian economic approach, rather than the vertical AS curve associated with a neoclassical approach, because our focus is on macroeconomic policy over the short-run business cycle rather than over the long run.) In this case, expansionary fiscal policy using tax cuts or increases in government spending can shift aggregate demand to AD_1, closer to the full-employment level of output. In addition, the price level would rise back to the level P_1 associated with potential GDP.

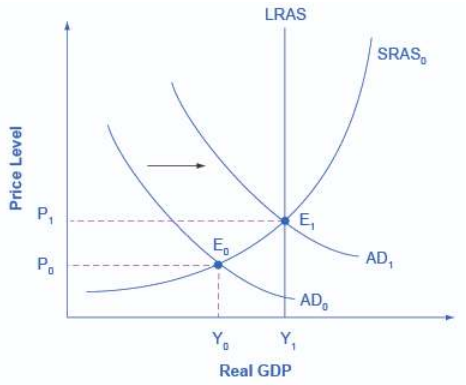


Figure 2. Expansionary Fiscal Policy. The original equilibrium (E_0) represents a recession, occurring at a quantity of output (Yr) below potential GDP. However, a shift of aggregate demand from AD_0 to AD_1, enacted through an expansionary fiscal policy, can move the economy to a new equilibrium output of E_1 at the level of potential GDP. Since the economy was originally producing below potential GDP, any inflationary increase in the price level from P_0 to P_1 that results should be relatively small.

Should the government use tax cuts or spending increases, or a mix of the two, to carry out expansionary fiscal policy? After the Great Recession of 2008–2009, U.S. government spending rose from 19.6% of GDP in 2007 to 24.6% in 2009, while tax revenues declined from 18.5% of GDP in 2007 to 14.8% in 2009.

This very large budget deficit was produced by a combination of automatic stabilizers and discretionary fiscal policy. The Great Recession meant less tax-generating economic activity, which triggered the automatic stabilizers that reduce taxes. Most economists, even those who are concerned about a possible pattern of persistently large budget deficits, are much less concerned or even quite supportive of larger budget deficits in the short run of a few years during and immediately after a severe recession.

The Politics of Expansionary Fiscal Policy

The choice between whether to use tax or spending tools often has a political tinge. As a general statement, conservatives and Republicans prefer to see expansionary fiscal policy carried out by tax cuts, while liberals and Democrats prefer that expansionary fiscal policy be implemented through spending increases. The Obama administration and Congress passed an $830 billion expansionary policy in early 2009 involving both tax cuts and increases in government spending, according to the Congressional Budget Office. However, state and local governments, whose budgets were also hard hit by the recession, began cutting their spending—a policy that offset federal expansionary policy.

The conflict over which policy tool to use can be frustrating to those who want to categorize economics as "liberal" or "conservative," or who want to use economic models to argue against their political opponents. But the AD–AS model can be used both by advocates of smaller government, who seek to reduce taxes and government spending, and by advocates of bigger government, who seek to raise taxes and government spending. Economic studies of specific taxing and spending programs can help to inform decisions about whether taxes or spending should be changed, and in what ways. Ultimately, decisions about whether to use tax or spending mechanisms to implement macroeconomic policy is, in part, a political decision rather than a purely economic one.

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Contractionary Fiscal Policy

Fiscal policy can also be used to slow down an overheating economy. Suppose the macro equilibrium occurs at a level of GDP above potential, as shown in Figure 3. The intersection of aggregate demand (AD_0) and aggregate supply (AS_0) occurs at equilibrium E_0. In this situation, contractionary fiscal policy involving federal spending cuts or tax increases can help to reduce the upward pressure on the price level by shifting aggregate demand to the left, to AD_1, and causing the new equilibrium E_1 to be at potential GDP.

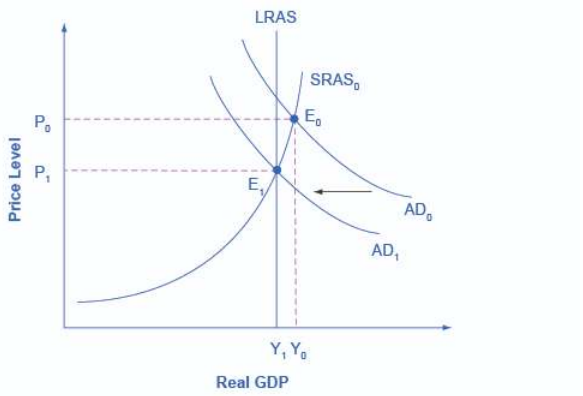


Figure 3. A Contractionary Fiscal Policy. The economy starts at the equilibrium quantity of output Yr, which is above potential GDP. The extremely high level of aggregate demand will generate inflationary increases in the price level. A contractionary fiscal policy can shift aggregate demand down from AD_0 to AD_1, leading to a new equilibrium output E_1, which occurs at potential GDP.

Again, the AD–AS model does not dictate how this contractionary fiscal policy is to be carried out. Some may prefer spending cuts; others may prefer tax increases; still others may say that it depends on the specific situation. The model only argues that, in this situation, aggregate demand needs to be reduced.

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Learning Objectives

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11.12: Learn By Doing- Expansionary and Contractionary Fiscal Policy

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11.13: Introduction to Fiscal Policy Approaches

What you'll learn to do: compare neoclassical and Keynesian approaches to Fiscal Policy



Figure 1. The American Recover and Reinvestment Act is an example of fiscal policy that added more than 8 hundred billion dollars to the United States economy. This stimulus package was split between government spending and tax cuts.

In this section, you'll learn about how and why there are varying recommendations from economists regarding fiscal policy. As you know, neoclassical economists emphasize less government intervention with the assumption that the economy will return to full employment in the long run. Keynesian economists recommend more intervention, and in this section you'll learn about some of the specific arguments for both sides.

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11.14: Neoclassical Fiscal Policy and Supply-Side Economics

Learning Objectives

- Explain supply-side economics, including the role of tax cuts and the Laffer curve
- Compare and contrast Keynesian and neoclassical approaches to fiscal policy



Figure 1. Alan Greenspan, neoclassical economists and Chairman of the Federal Reserve from 1987 to 2006.

Much of the previous discussion in this module has taken a Keynesian policy-activist perspective. Recall that the classical, hands-off, approach was initially recommended when the economy collapsed during the Great Depression, but then Keynes came along and recommended that the government step in and intervene in order to make up for a shortfall in private sector spending. One criticism of the Keynesian approach is that the government needs to deficit spend in order to stimulate the economy. Deficit spending requires the government to borrow money, which may lead to higher interest rates, making it harder for private businesses to borrow money. This is known as **crowding out**, and weakens the effects of fiscal policy. Keynesians would argue that any crowding out is minimal, since the economy is not operating at full capacity; thus resources can be found easily without taking them away from private businesses.

Neoclassicals believe in a more passive fiscal policy approach, designed to promote economic growth with stable prices. They believe in low tax rates and limited government spending, which they believe will allow the private sector, and thus the economy as a whole, to flourish. Alan Greenspan, former chair of the Board of Governors of the Federal Reserve is one such neoclassical economist. Many neoclassicals, including Greenspan, are wary of budget deficits, arguing that they provide a drag on economic growth because of crowding out.

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Watch It: Tax Cuts During the Recession

Watch this video to understand how some neoclassically-minded small business owners and economists felt about the possibility of ending the Bush tax cuts in 2010. Note that these tax cuts were eventually extended, although changes were made later in the American Taxpayer Relief Act of 2012.

A link to an interactive elements can be found at the bottom of this page.

Supply-Side Economics

A particular type of Neoclassical economics became popular in the 1980s, after the election of President Ronald Reagan. This was **supply-side economics,** also known as Reaganomics. Supply-siders believe that economic activity is motivated by after-tax returns to that activity. Thus, people are attracted to jobs that pay well, and businesses are attracted to industries with high profits. Additionally, tax cuts increase economic activity.

Supply-siders argue that three key elements affect the macro economy:

- Labor supply, which is determined by wages and salaries after taxes are removed (e.g. take-home pay);
- Saving, which is determined by the after-tax rate of return to saving; and
- Business investment, which is determined by the after-tax rate of return to capital investment.

The implication is that tax cuts on personal income cause an increase in the supply of labor as individuals increase their work effort and work hours. Tax cuts on saving cause people to save more. For this reason, supply-siders favor reductions in capital gains tax rates. Tax cuts on corporate profits cause an increase business investment. Increased labor supply, saving and investment lead to more aggregate supply and enhanced economic growth.

Some supply siders favor a **flat tax**, which we introduced earlier in the section on taxation. A flat tax is proportional, meaning that all individuals or corporations would pay the same tax rate. A genuinely proportional tax should, theoretically, enhance economic efficiency, but it would make the tax system less progressive. This illustrates the frequent trade-off between efficiency and equity in economics. Some analysts see a flat tax as a Trojan horse designed to reduce tax rates and tax revenues in general. For this reason, tax reforms are often designed to be neutral, meaning that they keep the average tax rates and the tax revenue generated unchanged.

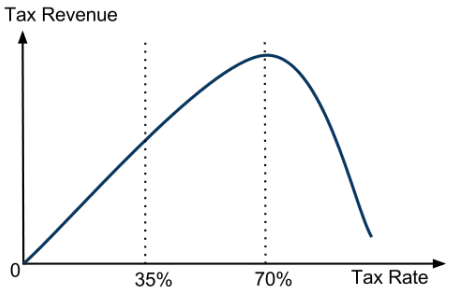


Figure 2. The Laffer Curve. As tax rates increase, tax revenues (i.e. what the government receives) increase at first, but then decrease once rates get "too high" as people reduce their work effort or hide their income. The figure indicates that the tax rate which maximizes tax revenue is 70%, but this is just an illustration of the concept.

Supply-siders don't worry much about budget deficits. They believe that tax cuts will stimulate the economy and bring in additional tax revenues so that that tax cuts lead to more revenues and thus lower budget deficits. This is the idea behind the Laffer Curve, which shows the relationship between tax rates and tax revenues, i.e. T = t*Y, where T is tax revenues, t is the tax rate, and Y is income (or the tax base). At low tax rates, higher tax rates cause higher tax revenues. At some point, though, tax rates get so high that people start to work less, or hide their income, so that higher rates lead to lower tax revenues. If tax rates are sufficiently high then, reducing them will raise income and raise tax revenues so that budget deficits fall.

The Laffer Curve is somewhat controversial in practice. Most economists don't believe that the U.S. is on the downward sloping part of the curve. Supply-siders argue then that even if budget deficits don't fall in response to tax cuts, the economic growth generated will bring in enough additional tax revenues to make them sustainable.

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Watch It

Watch this video for a review of fiscal policy and to learn in more detail about the varying debates about when and how government should intervene in the economy. First, you'll review the Keynesian and neoclassical approaches to fiscal policy, then take a look at how different approaches were used to deal with the Great Recession, which was a global phenomenon. Great Britain and other Western European nations took a neoclassical approach and implemented **austerity programs** (raising taxes and cutting government spending to reduce budget deficits and public debt). The U.S. took a more Keynesian approach with the American Recovery and Reinvestment Act of 2009 (ARRA), which combined tax cuts and government spending increases. As a result, the U.S. economy recovered from the Great Recession more quickly than did the European economies.

Another thing to consider when analyzing fiscal policy is the **spending multiplier effect,** which we introduced in an earlier module. When government increases spending, the money can ripple through the economy and have a more than proportionate impact on GDP. If the economy is already booming and resources are full employed, then the multiplier tends to stay around 1,

thus an increase in government spending doesn't have a large impact. During a recession, though, the multiplier may be closer to 2 and have a much larger effect. .

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Glossary

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11.15: Fiscal Policy, Investment, and Crowding Out

Learning Objectives

- Explain crowding out and its effect on physical capital investment
- Explain how economic growth is tied to investments in physical capital, human capital, and technology

Neoclassical economists believe we should focus attention on the long run (e.g. economic growth) and that the short run will take care of itself. We know that economic growth, defined as the percentage change in real GDP over time, comes about through increases in the quantity and quality of labor, physical capital, and technology—all set in an economic environment where firms and individuals can react to the incentives provided by well-functioning markets and flexible prices. In this section, we will examine how fiscal policy can affect these variables.

Government borrowing can reduce the financial capital available for private firms to invest in physical capital. However, government spending can also encourage certain elements of long-term growth, such as spending on roads or water systems, on education, or on research and development that creates new technology.

Crowding Out Physical Capital Investment

When government conducts an expansionary fiscal policy (i.e. increases in government spending or decreases in tax rate, it may run afoul of the **crowding out** effect. Expansionary fiscal policy means an increase in the budget deficit. The government is spending more money than it has in income. Where does government obtain the necessary funds to cover it's increased deficit? The answer is borrowing.

A larger budget deficit will increase demand for financial capital. The supply of funds in financial markets is the sum of private saving, government saving, and net investment by foreigners into domestic financial markets. If private saving and net foreign investment remain the same, then less financial capital will be available for private investment in physical capital. When government borrowing soaks up available financial capital and leaves less for private investment in physical capital (i.e. increased budget deficit means a reduction in government saving), the result is crowding out.

The Interest Rate Connection

Let's look at the details of how crowding out occurs. A larger federal budget deficit requires increased government borrowing in financial markets. How will this affect interest rates in financial markets? In Figure 1, the original equilibrium (E_0) where the demand curve (D_0) for financial capital intersects with the supply curve (S_0) occurs at an interest rate of 5% and an equilibrium quantity equal to 20% of GDP. However, as the government budget deficit increases, the demand curve for financial capital shifts from D_0 to D_1. The new equilibrium (E_1) occurs at an interest rate of 6% and an equilibrium quantity of 21% of GDP.

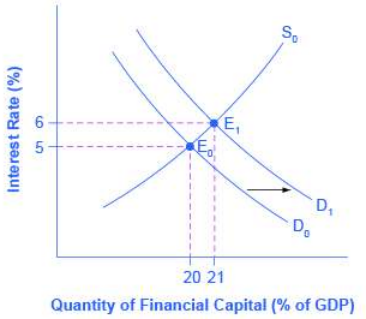


Figure 1. Budget Deficits and Interest Rates. In the financial market, an increase in government borrowing can shift the demand curve for financial capital to the right from D_0 to D_1. As the equilibrium interest rate shifts from E_0 to E_1, the interest rate rises from 5% to 6% in this example. The higher interest rate is one economic mechanism by which government borrowing can crowd out private investment.

Higher interest rates tend to reduce private investment in physical capital. The new factory that made sense when a company could borrow the necessary funding at 5%, no longer makes sense at an interest rate of 6%.

A key question then is how much crowding out occurs. The answer is it depends. Crowding out seems to occur less during recession since banks have savings to lend, but limited borrowers.

The degree of crowding out also depends on the amount of private saving and inflows of foreign financial investment. In the mid-1980s, for example, government budget deficits increased substantially without a corresponding drop off in private investment. In 2009, nonresidential private fixed investment dropped by $300 billion from its previous level of $1,941 billion in 2008, primarily because, during a recession, firms lack both the funds and the incentive to invest. Investment growth between 2009 and 2014 averaged approximately 5.9% to $2,210.5 billion—only slightly above its 2008 level, according to the Bureau of Economic Analysis. During that same period, interest rates dropped from 3.94% to less than a quarter percent as the Federal Reserve took dramatic action to prevent a depression by increasing the money supply through lowering short-term interest rates. The crowding out of private investment due to government borrowing to finance expenditures appears to have been suspended during the Great Recession. However, as the economy improves and interest rates rise, government borrowing may potentially create pressure on interest rates.

Effects of Crowding Out

How does crowding out affect the path of the economy? If the purpose of expansionary fiscal policy was to stimulate GDP and employment (i.e. a Keynesian stimulus for the short-term), the extent to which crowding out occurs will limit the stimulus. If say a $100 billion increase in government spending results in a $50 billion decrease in private investment spending, then the net increase to total expenditure is $50 billion instead of $100 billion. Crowding out reduces the effects of a fiscal stimulus.

However, the long run effects, emphasized by neoclassical economists, are more serious. Recall that economic growth is caused by investment in physical capital. If crowding out causes a reduction in private investment, it also leads to a reduction in economic growth over the long term. This is another reason why neoclassicals favor business tax cuts over government spending increases since business tax cuts tend to stimulate private investment.

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Public Investment in Physical Capital

All government spending does not cause crowding out. Public infrastructure spending on physical capital can enhance private investment. Public infrastructure spending in investment in roads and bridges; water supply and sewers; seaports and airports; schools and hospitals; plants that generate electricity, like hydroelectric dams or windmills; telecommunications facilities; just to name a few. New highways (or other transportation networks) can raise the rate of return on private investment by making it easier to transport products to market. As a result, infrastructure investments can result in increased private investment too. Part of the reason for the booming U.S. economy during the 1960s may have been the completion of the interstate highway system.

In 2014, the U.S. federal government budget for Fiscal Year 2014 shows that the United States spent about $92 billion on transportation, including highways, mass transit, and airports. Table 1 shows the federal government’s total outlay for 2014 for major public physical capital investment in the United States. We have omitted physical capital related to the military or to residences where people live from this table, because the focus here is on public investments that have a direct effect on raising output in the private sector.

Table 1. Grants for Major Physical Capital Investment, 2014

Type of Public Physical Capital	Federal Outlays 2014 ($ millions)
Transportation	$91,915
Community and regional development	$20,670
Natural resources and the environment	$36,171
Education, training, employment, and social services	$90,615
Other	$37,282
Total	**$276,653**

Public physical capital investment of this sort can increase the economy's output and productivity. An economy with reliable roads and electricity will be able to produce more. However, it is hard to quantify how much government investment in physical capital will benefit the economy, because government responds to political as well as economic incentives. When a firm makes an investment in physical capital, it is subject to the discipline of the market: if it does not receive a positive return on investment, the firm may lose money or even go out of business.

If a government decides to finance an investment in public physical capital with higher taxes or lower government spending in other areas, it need not worry that it is directly crowding out private investment. Indirectly however, higher household taxes could cut down on the level of private savings available and have a similar effect. If a government decides to finance an investment in public physical capital by borrowing, it may end up increasing the quantity of public physical capital at the cost of crowding out investment in private physical capital, which could be more beneficial to the economy.

Public Investment in Human Capital

In most countries, the government plays a large role in society's investment in human capital through the education system, both K12 and higher education. Education conveys positive externalities–while individuals gain from an education, so does society at large. Educated citizens are more thoughtful voters. A highly educated and skilled workforce contributes to a higher rate of economic growth. For the low-income nations of the world, additional investment in human capital seems likely to increase productivity and growth. Of course, spending more dollars on education is no guarantee that students will learn more. Despite significant increases over the last several decades in U.S. educational spending per pupil, standardized test scores like the SAT have failed to increase significantly. Still, in this day and age it's hard to argue that education isn't important.

Other government programs seek to increase human capital either before or after the K–12 education system. Programs for early childhood education, like the federal **Head Start program**, are directed at families where the parents may have limited educational and financial resources. Government also offers substantial support for universities and colleges. For example, in the United States about 60% of students take at least a few college or university classes beyond the high school level. In Germany and Japan, about half of all students take classes beyond the comparable high school level. In the countries of Latin America, only about one student in four takes classes beyond the high school level, and in the nations of sub-Saharan Africa, only about one student in 20.

Not all spending on educational human capital needs to happen through the government: many college students in the United States pay a substantial share of the cost of their education. If low-income countries of the world are going to experience a widespread increase in their education levels for grade-school children, government spending seems likely to play a substantial role. For the U.S. economy, and for other high-income countries, the primary focus at this time is more on how to get a bigger return from existing spending on education and how to improve the performance of the average high school graduate, rather than dramatic increases in education spending.

How Fiscal Policy Can Improve Technology

Research and development (R&D) efforts are the lifeblood of new technology. According to the National Science Foundation, federal outlays for research, development, and physical plant improvements to various governmental agencies have remained at an average of 8.8% of GDP. About one-fifth of U.S. R&D spending goes to defense and space-oriented research. Although defense-

oriented R&D spending may sometimes produce consumer-oriented spinoffs, R&D that is aimed at producing new weapons is less likely to benefit the civilian economy than direct civilian R&D spending.

Fiscal policy can encourage R&D using either direct spending or tax policy. Government could spend more on the R&D that it carries out in government laboratories, as well as expanding federal R&D grants to universities and colleges, nonprofit organizations, and the private sector. By 2014, the federal share of R&D outlays totaled $135.5 billion, or about 4% of the federal government's total budget outlays, according to data from the National Science Foundation. Fiscal policy can also support R&D through tax incentives, which allow firms to reduce their tax bill as they increase spending on research and development.

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Summary of Fiscal Policy, Investment, and Economic Growth

Investment in physical capital, human capital, and new technology is essential for long-term economic growth, as Table 2 summarizes. In a market-oriented economy, private firms will undertake most of the investment in physical capital, and fiscal policy should seek to avoid a long series of outsized budget deficits that might crowd out such investment. We will see the effects of many growth-oriented policies very gradually over time, as students are better educated, we make physical capital investments, and man invents and implements new technologies.

Table 2. Investment Role of Public and Private Sector in a Market Economy

	Physical Capital	Human Capital	New Technology
Private Sector	New investment in property and equipment	On-the-job training	Research and development
Public Sector	Public infrastructure	Public education Job training	Research and development encouraged through private sector incentives and direct spending.

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Learning Objectives

[glossary-page][glossary-term]crowding out:[/glossary-term]
[glossary-definition]federal spending and borrowing causes interest rates to rise and business investment to fall; crowding out can also be caused by federal tax cuts[/glossary-definition][glossary-term]Head Start program:[/glossary-term]
[glossary-definition]a program for early childhood education directed at families with limited educational and financial resources.[/glossary-definition][glossary-term]Infrastructure:[/glossary-term][glossary-definition]public investment in public and externality goods like roads and transportation features (e.g. airports, seaports), water supply and sewers, schools and hospitals.[/glossary-definition][/glossary-page]

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11.16: Putting It Together- Fiscal Policy



In this module, you learned about fiscal policy and the power that government has to adjust government spending and taxes to stimulate or slow down the economy. First, you learned that the federal government spends most of its budget in a small number of areas, including national defense, social security, social welfare programs, healthcare, and interest on the federal debt. Most federal tax revenue comes from individuals' income, though some comes from corporate profits. State and local governments spend the majority of their budgets on education and transportation, while their tax revenue comes primarily from property and sales taxes. Some states don't even have an income tax.

Approaches to fiscal policy vary. Keynesians favor an activist fiscal policy. Congress can intentionally try to stimulate the economy using expansionary fiscal policy by either cutting taxes or increasing government spending. Congress can also try to slow the economy down if is overheating by using contractionary fiscal policy, either by increasing taxes or cutting on spending. Neoclassical economicsts prefer a more passive fiscal policy with low tax rates to promote economic growth.

We will develop a more sophisticated understanding of fiscal policy in a future module, but first we need to learn about monetary policy.

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11.17: Discussion- Fiscal Policy

Respond to the following prompt in a post with a minimum of 200 words, then comment on at least TWO other posts.

- Compare and contrast the use of government spending changes versus tax changes as a means of influencing the course of the economy. Is one or the other preferable in specific situations? Imagine for a moment that you have two roommates, who each have opposing viewpoints on nearly everything, including politics and economics. Taylor is adamant that the best way to manage the economy is through tax changes, while Morgan insists that it's better to adjust the economy through government spending. What would a Neoclassical economist say? What would a Keynesian economist say? Which roommate do you agree with, and why? Find a news article to help support your opinion. Summarize the article and include the link to in your response.

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11.18: Assignment- Economic Impact of Lower Corporate Tax Rate

The AD-AS model can be used to analyze the effects of fiscal policy, including changes in government spending or taxes. Suppose Congress votes to decrease corporate income tax rates. Use the AD/AS model to analyze the likely impact of the tax cuts on the macroeconomy. Show graphically and explain your reasoning. What exactly causes AD and/or AS to shift? What happens to GDP and the aggregate price level? Why?

Rubric

Criteria	Not Evident	Developing	Proficient	Distinguished	Weight
Explain the Keynesian perspective on tax cuts and show graphically.					4
Explain the Neoclassical Perspective on tax cuts and show graphically.					4
Explain the effect of tax cuts on GDP. Show graphically.					4
Explain the effect of tax cuts on the price level. Show graphically.					4
Write up your analysis using correct language, explaining all your work.					4
					Total: ___/20

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11.19: Assignment- Problem Set — Fiscal Policy

Click on the following link to download the problem set for this module:

- Fiscal Policy Problem Set

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CHAPTER OVERVIEW

12: Money and Banking

12.1: Why It Matters- Money and Banking
12.2: Introduction to Defining Money
12.3: Defining Money by Its Functions
12.4: Measuring Money- Currency, M1, and M2
12.5: Credit
12.6: Introduction to Financial Markets
12.7: Financial Markets and Assets
12.8: Financial Markets, Supply and Demand, and Interest
12.9: Introduction to Banking
12.10: The Commercial Banking System
12.11: Banking Assets and Liabilities
12.12: Introduction to Lending and Money Creation
12.13: How Banks Create Money
12.14: Putting It Together- Money and Banking
12.15: Discussion- Money and Banking
12.16: Assignment- Baby Boomers
12.17: Assignment- Problem Set — Money and Banking

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12.1: Why It Matters- Money and Banking

Why explain the role of money and banking in an economy?

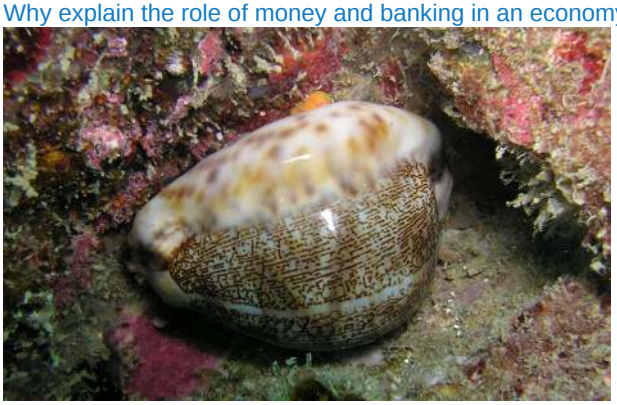


Figure 1. Cowrie Shell or Money? Is this an image of a cowrie shell or money? The answer is: Both. For centuries, the extremely durable cowrie shell was used as a medium of exchange in various parts of the world. (Credit: modification of work by "prilfish"/Flickr Creative Commons).

This is another practical module. Have you ever made a purchase, saved some of your paycheck, or taken out a loan? If so, this module is for you, and you probably know at least some of what the module has to say. If not, it's time you learned this real life knowledge.



Figure 2. Bank Collage. TDBank, Bank of America, and Wells Fargo by Mike Mozart, CC-BY.

It's a bit ironic that after all you have studied in this course about buying, selling, producing and consuming, it's only now that we introduce money and the financial side of the economy. In an important sense, this module is similar to the previous one on budgets and fiscal policy. In this module, like the last one, we start with practical stuff:

- What is money?
- What are banks?
- How does credit work?
- What is the difference between a credit card and a debit card?

Understanding how these things work will provide a solid foundation for understanding the ways in which the government intervenes in the macroeconomy through monetary policy and bank regulations, which we'll investigate in another module.

THE MANY DISGUISES OF MONEY: FROM COWRIES TO BITCOINS

Here is a trivia question: In the history of the world, what item was used for money over the broadest geographic area and for the longest period of time? The answer is not gold, silver, or any precious metal. It is the cowrie, a mollusk shell found mainly off the Maldives Islands in the Indian Ocean. Cowries served as money as early as 700 B.C. in China. By the 1500s, they were in widespread use across India and Africa. For several centuries after that, cowries were used in markets including southern Europe, western Africa, India, and China for a wide range of purchases: everything from buying lunch or a ferry ride to paying for a shipload of silk or rice. Cowries were still acceptable as a way of paying taxes in certain African nations in the early twentieth century.

What made cowries work so well as money? First, they are extremely durable—lasting a century or more. As the late economic historian Karl Polyani put it, they can be "poured, sacked, shoveled, hoarded in heaps" while remaining "clean, dainty, stainless, polished, and milk-white." Second, parties could use cowries either by counting shells of a certain size, or—for large purchases—by measuring the weight or volume of the total shells to be exchanged. Third, it was impossible to counterfeit a cowrie shell, but gold or silver coins could be counterfeited by making copies with cheaper metals. Finally, in the heyday of cowrie money, from the 1500s into the 1800s, the collection of cowries was tightly controlled, first by the Portuguese and later by the Dutch and the English. As a result, the supply of cowries was allowed to grow quickly enough to serve the needs of commerce, but not so quickly that they were no longer scarce. Money throughout the ages has taken many different forms and continues to evolve even today. What do you think money is?

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12.2: Introduction to Defining Money

What you'll learn to do: define money, explain the functions of money, and define liquidity



You use money nearly every day, but in this section, you will take a deeper look at what money really is—what it represents, why it has value, and what purpose it serves.

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12.3: Defining Money by Its Functions

Learning Objectives

- Explain the functions of money
- Contrast commodity money and fiat money

Barter and the Double Coincidence of Wants

Money for the sake of money is not an end in itself. You cannot eat dollar bills or wear your bank account. Ultimately, money is only useful because you can exchange it for goods and services. As the American writer and humorist Ambrose Bierce (1842–1914) wrote in 1911, money is a "blessing that is of no advantage to us excepting when we part with it." Money is what people regularly use when purchasing or selling goods and services; thus for something to be considered money, it must be widely accepted by both buyers and sellers. This concept of money is intentionally flexible, because money has taken a wide variety of forms in different cultures.

To understand the usefulness of money, we must consider what the world would be like without money. How would people exchange goods and services? Economies without money typically use the barter system. **Barter**—literally trading one good or service for another—is highly inefficient for conducting transactions. In a barter economy, an exchange between two people requires a **double coincidence of wants**, which means that what one person wants to buy is exactly what the other person wants to sell. This is harder than it sounds.

Suppose an accountant wants a new pair of shoes. The accountant doesn't just need to find someone who has a pair of shoes in the correct size to sell, but they have to find a person who will also be willing to exchange the shoes for what the accountant has to offer, namely accounting services. Trades like these are likely to be difficult to arrange. Now imagine how this would work in a complex, modern economy, with its extensive division of labor that involves thousands upon thousands of different jobs and different goods & services. The number of transactions that end up taking place is likely to be much smaller than in an economy with money.

Another problem with the barter system is that it does not allow us to easily enter into future contracts for the purchase of many goods and services. For example, if the goods are perishable it may be difficult to exchange them today for other goods in the future. Imagine a farmer wanting to buy a tractor in six months using a fresh crop of strawberries harvested today. Because the strawberries won't last, such a transaction is unlikely to occur.

While a barter system might work adequately in small economies, it will limit these economies' growth. The time that individuals would otherwise spend producing goods and services and enjoying leisure time would instead be spent bartering.

Functions of Money

Money solves the double coincidence of wants problem. First, since money is generally accepted as a **means of payment** (or **medium of exchange**), the accountant can pay for new shoes with money, which the shoe seller is willing to accept (even if they don't need accounting services) since he or she can use the money to purchase something they do need.

Second, people are willing to sell something for money, even if they have no immediate need to purchase something else, because money serves as a **store of value**. A store of value is anything that holds value. Some things are better stores of value than other things. Real estate has traditionally been a good store of value since it tends to increase in value over time. Shoes are not a particularly good store of value, because they wear out as you wear them, and even if you don't, styles change over time making what used to be a stylish pair of shoes, nothing special and thus worth less today. Money doesn't have to be a *perfect* store of value to be acceptable. In an economy with inflation, money loses some buying power each year, but it remains money.

Third, money serves as a **unit of account**, which means that it is the ruler by which other economic values are measured. If there were no unit of account, the price of every good or service would have to be expressed in terms of the price of every other good and services. What you pay would depend on what you had to sell! Businesses would have to keep track of the value of everything someone might sell in order to be able to decide on a price for their products. Money solves the problem by acting as a common denominator, an accounting method that simplifies thinking about trade-offs.

Try It

https://assessments.lumenlearning.co...sessments/7595
https://assessments.lumenlearning.co...sessments/7596

Watch It

Learn more about the functions of money in this video clip.

An interactive or media element has been excluded from this version of the text. You can view it online here: http://pb.libretexts.org/mlum/?p=515

One additional function of money is that it must serve as a **standard of deferred payment**. This means that if money is usable today to make purchases, it must also be acceptable for contracts signed today that will be paid in the *future*. Loans and future agreements are stated in monetary terms and the standard of deferred payment is what allows us to buy goods and services today and pay in the future.

What is Money?

Money is anything that can serve all of these functions— it is a medium of exchange, a store of value, a unit of account, and a standard of deferred payment.

Commodity versus Fiat Money

Money has taken a wide variety of forms in different cultures. Gold, silver, cowrie shells, cigarettes, and even cocoa beans have been used as money. These items are examples of **commodity money**, which means they also have a value from use as something other than money. Gold, for example, has been used throughout the ages as jewelry or art, as well as money. Gold is a good conductor of electricity and is used today in the electronics and aerospace industry. Gold is also used in the manufacturing of energy efficient reflective glass for skyscrapers and is used in the medical industry as well.



Figure 1. A Silver Certificate and a Modern U.S. Bill. Until 1958, silver certificates were commodity-backed money—backed by silver, as indicated by the words “Silver Certificate” printed at the top of the bill. Today, U.S. bills are backed by the Federal Reserve, but as fiat money. (Credit: “The.Comedian”/Flickr Creative Commons).

As commodity money, gold has historically served its purpose as a medium of exchange, a store of value, and as a unit of account. **Commodity-backed currencies** are dollar bills or other currencies with values backed up by gold or some other commodity held at a bank. During much of its history, the money supply in the United States was backed by gold and silver. Interestingly, antique dollars dated as late as 1957, have “Silver Certificate” printed over the portrait of George Washington, as shown in Figure 1. This meant that the holder could take the bill to the appropriate bank and exchange it for a dollar’s worth of silver. As economies grew and became more global in nature, the use of commodity monies became more cumbersome. Countries moved towards the use of **fiat money.** Fiat money has no intrinsic value, but is declared by a government to be the legal tender of a country. The United States’ paper money, for example, carries the statement: “THIS NOTE IS LEGAL TENDER FOR ALL DEBTS, PUBLIC AND PRIVATE.” In other words, by government decree, if you owe a debt, then legally speaking, you can pay that debt with the U.S.

currency, even though it is not backed by a commodity. The only backing of our money is universal faith and trust that the currency has value, and nothing more.

Try It

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https://assessments.lumenlearning.co...sessments/7598

Watch It

This video provides an overview of how money has evolved through the ages.

An interactive or media element has been excluded from this version of the text. You can view it online here: http://pb.libretexts.org/mlum/?p=515

GLOSSARY

[glossary-page][glossary-term]barter: [/glossary-term]
[glossary-definition]literally, trading one good or service for another, without using money[/glossary-definition]
[glossary-term]commodity money: [/glossary-term]
[glossary-definition]an item that is used as money, but which also has value from its use as something other than money[/glossary-definition]
[glossary-term]commodity-backed currencies:[/glossary-term]
[glossary-definition]dollar bills or other currencies with values backed up by gold or another commodity[/glossary-definition]
[glossary-term]double coincidence of wants:[/glossary-term]
[glossary-definition]a situation in which two people each want some good or service that the other person can provide[/glossary-definition]
[glossary-term]fiat money:[/glossary-term]
[glossary-definition]something used as money, but which has no intrinsic value besides that[/glossary-definition]
[glossary-term]medium of exchange: [/glossary-term]
[glossary-definition]whatever is widely accepted as a method of payment[/glossary-definition]
[glossary-term]money: [/glossary-term]
[glossary-definition]whatever serves society in four functions: as a medium of exchange, a store of value, a unit of account, and a standard of deferred payment.[/glossary-definition]
[glossary-term]standard of deferred payment: [/glossary-term]
[glossary-definition]money must also be acceptable to make purchases today that will be paid in the future[/glossary-definition]
[glossary-term]store of value: [/glossary-term]
[glossary-definition]something that serves as a way of preserving economic value that one can spend or consume in the future[/glossary-definition]
[glossary-term]unit of account:[/glossary-term]
[glossary-definition]the common way in which we measure market values in an economy[/glossary-definition][/glossary-page]

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- (Macro) Episode 29: What is Money?. **Authored by**: Dr. Mary J. McGlasson. **Located at**: https://www.youtube.com/watch?v=DjTs-rjVkB8&index=29&list=PLF2A3693D8481F442. **License**: *CC BY: Attribution*

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12.4: Measuring Money- Currency, M1, and M2

Learning Objectives

- Contrast and classify monies as either M1 money supply and M2 money supply

Measuring Money: Currency, M1, and M2

We defined money as anything that is generally accepted as a means of payment, is a store of value, can be used as a unit of account or a standard of deferred payment. What exactly is included?

Cash in your pocket certainly serves as money. But what about checks or credit cards? Are they money, too? Rather than trying to state a single way of measuring money, economists offer broader definitions of money based on the concept of liquidity. **Liquidity** refers to how quickly an asset can be used to buy a good or service. Liquidity is a relative concept. For example, cash is very liquid. Your $10 bill can be easily used to buy a hamburger at lunchtime. However, $10 that you have in your savings account is not so easy to use. You must go to the bank or ATM machine and withdraw that cash to buy your lunch. Thus, $10 in your savings account is *less* liquid. Stocks and bonds are even less liquid, since they must be sold to convert them to means of payment, and they might suffer a loss in value in the process.

Economists generally use two definitions of the supply of money: M1 and M2. **M1** includes those assets that are the most liquid such as cash, checkable (demand) deposits, and traveler's checks. **M2 includes M1** plus some less liquid (but still fairly liquid) assets, including savings and time deposits, certificates of deposit, and money market funds. Let's examine these two money definitions in more detail.

M1

M1 is the most narrow definition of the money supply. It includes **coins and currency in circulation**—in other words they are not held held by the U.S. Treasury, or the Federal Reserve Bank, but circulate in the economy.

Closely related to currency are checkable deposits, also known as **demand deposits**. These are the amounts held in checking accounts. They are called demand deposits or checkable deposits because the banking institution must give the deposit holder his money "on demand" when a check is written or a debit card is used. These items together—currency, and checking accounts in banks—make up most of M1. Traveler's checks are also included in M1, but have decreased in use over the recent past.

M2

A broader definition of money, M2 includes everything in M1 but also adds other types of deposits. For example, M2 includes **savings deposits** in banks, which are bank accounts on which you cannot write a check directly, but from which you can easily withdraw the money at an automatic teller machine or bank. Many banks and other financial institutions also offer a chance to invest in **money market funds**, where the deposits of many individual investors are pooled together and invested in a safe way, such as short-term government bonds. Another ingredient of M2 is small denomination (that is, less than about $100,000) **certificates of deposit (CDs)** or **time deposits**, which are accounts that the depositor has committed to leaving in the bank for a certain period of time, ranging from a few months to a few years, in exchange for a higher interest rate. In short, all these types of M2 are money that you can withdraw and spend, but which require a greater effort to do so than the items in M1. Figure 1 should help in visualizing the relationship between M1 and M2. Note that M1 is included in the M2 calculation.



Figure 1. The Relationship between M1 and M2 Money. M1 and M2 money are the two mostly commonly used definitions of money. M1 = coins and currency in circulation + checkable (demand) deposit + traveler's checks. M2 = M1 + savings deposits + money market funds + certificates of deposit + other time deposits.

The Federal Reserve System is responsible for tracking the amounts of M1 and M2 and prepares a weekly release of information about the money supply. At the end of February 2015, M1 in the United States was $3 trillion, while M2 was $11.8 trillion. Table 1 gives a breakdown of the portion of each type of money that comprised M1 and M2 in February 2015, as provided by the Federal Reserve Bank.

Table 1. M1 and M2 Federal Reserve Statistical Release, Money Stock Measures(Source: Federal Reserve Statistical Release, http://www.federalreserve.gov/RELEAS....htm#t2tg1link)

Components of M1 in the U.S. (February 2015, Seasonally Adjusted)	**$ billions**
Currency	$1,271.8
Traveler's checks	$2.9
Demand deposits and other checking accounts	$1,713.5
Total M1	*$2,988.2 (or $3 trillion)*
Components of M2 in the U.S. (February 2015, Seasonally Adjusted)	**$ billions**
M1 money supply	$2,988.2
Savings accounts	$7,712.1
Time deposits	$509.2
Individual money market mutual fund balances	$610.8
Total M2	*$11,820.3 (or $11.8 trillion)*

The lines separating M1 and M2 can become a little blurry. Sometimes elements of M1 are not treated alike; for example, some businesses will not accept personal checks for large amounts, but will accept traveler's checks or cash. Changes in banking practices and technology have made the savings accounts in M2 more similar to the checking accounts in M1. For example, some savings accounts will allow depositors to write checks, use automatic teller machines, and pay bills over the Internet, which has made it easier to access savings accounts. As with many other economic terms and statistics, the important point is to know the strengths and limitations of the various definitions of money, not to believe that such definitions are as clear-cut to economists as, say, the definition of nitrogen is to chemists.

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https://assessments.lumenlearning.co...sessments/7600

Other Money

Where does "plastic money" like debit cards, credit cards, and smart money fit into this picture? A **debit card,** like a check, is an instruction to the user's bank to transfer money directly and immediately from your bank account to the seller. Thus, a debit card is every bit as much money as a check. It is important to note that in our definition of money, it is *checkable deposits* that are money, not the paper check or the debit card. Although you can make a purchase with a **credit card**, it is not considered money but rather a short term loan from the credit card company to you. When you make a purchase with a credit card, the credit card company immediately transfers money from its checking account to the seller, and at the end of the month, the credit card company sends you a bill for what you have charged that month. Until you pay the credit card bill, you have effectively borrowed money from the

credit card company. With a **smart card**, you can store a certain value of money on the card and then use the card to make purchases. Some "smart cards" used for specific purposes, like long-distance phone calls or making purchases at a campus bookstore and cafeteria, are not really all that smart, because they can only be used for certain purchases or in certain places.

In short, credit cards, debit cards, and smart cards are different ways to move money when a purchase is made. But having more credit cards or debit cards does not change the quantity of money in the economy, any more than having more checks printed increases the amount of money in your checking account.

One key message underlying this discussion of M1 and M2 is that money in a modern economy is not just paper bills and coins; instead, money is closely linked to bank accounts. Indeed, the macroeconomic policies concerning money are largely conducted through the banking system.

Try It

These questions allow you to get as much practice as you need, as you can click the link at the top of the first question ("Try another version of these questions") to get a new set of questions. Practice until you feel comfortable doing the questions.

[ohm_question]153264-153265[/ohm_question]

Glossary

[glossary-page][glossary-term]coins and currency in circulation:[/glossary-term]
[glossary-definition]the coins and bills that circulate in an economy that are not held by the U.S Treasury, at the Federal Reserve Bank, or in bank vaults[/glossary-definition]
[glossary-term]credit card:[/glossary-term]
[glossary-definition]immediately transfers money from the credit card company's checking account to the seller, and at the end of the month the user owes the money to the credit card company; a credit card is a short-term loan[/glossary-definition][glossary-term]debit card:[/glossary-term]
[glossary-definition]like a check, is an instruction to the user's bank to transfer money directly and immediately from your bank account to the seller[/glossary-definition]
[glossary-term]demand deposit:[/glossary-term]
[glossary-definition]checkable deposit in banks that is available by making a cash withdrawal or writing a check[/glossary-definition]
[glossary-term]liquidity:[/glossary-term]
[glossary-definition]how quickly and easily an asset can be converted to a means of payment to make a purchase[/glossary-definition]
[glossary-term]M1 money supply:[/glossary-term]
[glossary-definition]a narrow definition of the money supply that includes currency and checking accounts in banks, and to a lesser degree, traveler's checks.[/glossary-definition]
[glossary-term]M2 money supply:[/glossary-term]
[glossary-definition]a definition of the money supply that includes everything in M1, but also adds savings deposits, money market funds, and certificates of deposit[/glossary-definition]
[glossary-term]money market fund:[/glossary-term]
[glossary-definition]the deposits of many investors are pooled together and invested in a safe way like short-term government bonds[/glossary-definition]
[glossary-term]savings deposit:[/glossary-term]
[glossary-definition]bank account where you cannot withdraw money by writing a check, but can withdraw the money at a bank—or can transfer it easily to a checking account[/glossary-definition]
[glossary-term]smart card:[/glossary-term]
[glossary-definition]stores a certain value of money on a card and then one can use the card to make purchases[/glossary-definition]
[glossary-term]time deposit:[/glossary-term]
[glossary-definition]account that the depositor has committed to leaving in the bank for a certain period of time, in exchange for a higher rate of interest; also called certificate of deposit[/glossary-definition][/glossary-page]

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12.5: Credit

Learning Objectives

- Define and explain credit

What is Credit?

When you make a purchase using money that you don't have, you are using credit. Credit is someone else's money that they have lent to you. Typically you use credit to buy something like a car, a house, or college expenses, "big-ticket items" that will benefit you for a long time. Instead of saving up and only then paying for them, credit allows you to buy now and pay for them over time. Sometimes people obtain credit in advance so that in the future when opportunities or needs arise they will be able to buy something. This is particularly common for businesses. Either way, when you use credit, you are borrowing money.

Credit comes in many forms, including loans, bonds, notes, or lines of credit (like home equity loans). All are essentially IOUs: that is, promises to repay with interest. Debt is accumulated credit, less what has been repaid. If you look at a credit card statement, each purchase you make using a credit card is a loan from the credit card company to you. Your balance on the credit card statement is your debt to the credit card company. Of course, your total debt is the sum of money you have borrowed from **all** your creditors, less what you have repaid. This would include credit card debt, car loans, educational loans, mortgages…everything you have borrowed and not paid back.

Credit vs. Debit

Debit cards enable you to make purchases like credit cards do, but with one major difference. Debit cards are not credit! Rather, they draw on a bank account, so they are a form of money. When you buy something with a debit card, it is just as if (but more convenient than) going to the bank to make a withdrawal, and then spending the cash. Credit/debt is not a bad thing. It is a tool for buying things you can't afford to pay for all at once, and repaying the loan over a period of time. Most economic agents, that is, individuals or families, businesses and governments, borrow money/obtain credit at some point. The trick is to know what you're getting into and to use credit responsibly.

Try It

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https://assessments.lumenlearning.co...sessments/7602

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12.6: Introduction to Financial Markets

What you'll learn to do: describe the role financial markets play in an economy



In any given period, some households, businesses and governments earn more income than they spend. What do they do with their savings? Usually, it doesn't make sense to put savings under your mattress or bury them in your backyard. Neither of those options will help your savings grow.

Other households, businesses and governments spend more than they earn. Households borrow money for new homes and new cars. Businesses borrow money to finance new physical capital investments. Governments borrow money to finance budget deficits. Where can these households, businesses and governments find the money to finance their expenditures?

The answer to each of these questions is financial markets. Financial markets are where savers put their savings to work and borrowers find funding to borrow. In this section, we will provide an overview of financial markets to provide context for the subsequent discussion of money and the banking system.

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12.7: Financial Markets and Assets

Learning Outcomes

- Describe financial markets and assets, including securities

In earlier modules, we observed that individuals can either consume or save their income. We also noted that business investment in physical capital is the primary way they grow. Where do individuals put their savings, and where do businesses obtain the funding for investment expenditure? The answer to both of these questions is **financial markets**.

United States' households and businesses saved almost $2.9 trillion in 2012. Where did that savings go and what was it used for? Some of the savings ended up in banks, which in turn loaned the money to individuals or businesses that wanted to borrow money. Some was invested in private companies or loaned to government agencies that wanted to borrow money to raise funds for purposes like building roads or mass transit. Some firms reinvested their savings in their own businesses.

Financial markets include the banking system, equity markets like the New York Stock Exchange, or the NASDAQ Stock Market, bond markets, commodity markets and more. In the 21st Century, financial markets are global, Americans put their savings into foreign as well as domestic bank accounts, foreign and domestic stocks and foreign and domestic bonds. All financial assets are called **securities**. Equities (i.e. stocks) give savers ownership in a company in return for dividends (a regular payment from the company) and/or capital gains (e.g. when you sell the stock at a profit). Bonds are a type of debt. All forms of debt are IOUs, where a saver lends money to a borrower in return for an interest payment.

Borrowing: Banks and Bonds

Businesses need money to operate and to grow. When a firm has a record of earning revenues, or better yet, of earning profits, it becomes possible for the firm to borrow money. Firms have two main borrowing methods: banks and bonds.

A bank loan for a firm works in much the same way as a loan for an individual who is buying a car or a house. The firm borrows an amount of money and then promises to repay it, including some rate of interest, over a predetermined period of time. If the firm fails to make its loan payments, the bank (or banks) can take the firm to court and require it to sell its buildings or equipment to pay its debt.

Another source of financial capital is a bond. A **bond** is a financial contract like a loan, but with two additional properties: typically, bond interest rates are lower than loan interest rates, and there are organized secondary markets for bonds, making them more liquid to bondholders than loans. Bonds are issued by major corporations and also by various levels of government. For example, cities borrow money by issuing municipal bonds, states borrow money by issuing state bonds, and the federal government borrows money when the U.S. Department of the Treasury issues Treasury bonds.

Watch IT

Watch the clip from this video to see an explanation of how the government could sell bonds in order to raise funds to build a new stadium.

An interactive or media element has been excluded from this version of the text. You can view it online here: http://pb.libretexts.org/mlum/?p=523

A large company, for example, might issue bonds for $10 million. The firm promises to make interest payments at an annual rate of 8%, or $800,000 per year and then, after 10 years, will repay the $10 million it originally borrowed.

Treasury Bills, Notes and Bonds

When the U.S. federal government runs a deficit, it borrows the money from financial markets. The U.S. Treasury sells three types of debt: Treasury Bills, Treasury Notes and Treasury Bonds. Each of these debt instruments represents an IOU from the federal government. The difference between bills, notes and bonds is in their maturities: Bills are the shortest term debt with maturities less than one year. Notes have maturities between one and ten years. Bonds have maturities longer than ten years.

Corporate Stock

A **corporation** is a business that "incorporates"—that is owned by shareholders that have limited liability for the company's debt but share in its profits (and losses). Corporations may be private or public, and may or may not have publicly traded stock. They may raise funds to finance their operations or new investments by raising capital through selling stock or issuing bonds.

Those who buy the stock become the firm's owners, or shareholders. **Stock** represents firm ownership; that is, a person who owns 100% of a company's stock, by definition, owns the entire company. The company's stock is divided into **shares**. Corporate giants like IBM, AT&T, Ford, General Electric, Microsoft, Merck, and Exxon all have millions of stock shares. In most large and well-known firms, no individual owns a majority of the stock shares. Instead, large numbers of shareholders—even those who hold thousands of shares—each have only a small slice of the firm's overall ownership.

When a large number of shareholders own a company, there are three questions to ask:

1. How and when does the company obtain money from its sale?
2. What rate of return does the company promise to pay when it sells stock?
3. Who makes decisions in a company owned by a large number of shareholders?

First, a firm receives money from the stock sale only when the company sells its own stock to the public (the public includes individuals, **mutual funds**, insurance companies, and pension funds). We call a firm's first stock sale to the public an **initial public offering (IPO)**. The IPO is important for two reasons. For one, the IPO, and any stock issued thereafter, such as stock held as treasury stock (shares that a company keeps in their own treasury) or new stock issued later as a secondary offering, provides the funds to repay the early-stage investors, like the angel investors and the venture capital firms. A venture capital firm may have a 40% ownership in the firm. When the firm sells stock, the venture capital firm sells its part ownership of the firm to the public. A second reason for the importance of the IPO is that it provides the established company with financial capital for substantially expanding its operations.

However, most of the time when one buys and sells corporate stock the firm receives no financial return at all. If you buy General Motors stock, you almost certainly buy them from the current share owner, and General Motors does not receive any of your money. This pattern should not seem particularly odd. After all, if you buy a house, the current owner receives your money, not the original house builder. Similarly, when you buy stock shares, you are buying a small slice of the firm's ownership from the existing owner—and the firm that originally issued the stock is not a part of this transaction.

Second, when a firm decides to issue stock, it must recognize that investors will expect to receive a rate of return. That rate of return can come in two forms. A firm can make a direct payment to its shareholders, called a **dividend**. Alternatively, a financial investor might buy a share of stock in Wal-Mart for $45 and then later sell it to someone else for $60, for $15 gain. We call the increase in the stock value (or of any asset) between when one buys and sells it a **capital gain**. Note that it is also possible that a stockholder can suffer a capital loss, if the price of the stock when sold is less than the price when it was purchased. Thus, while the potential benefits of stock ownership are unlimited, there is a risk of losing some or all of what was invested.

Third: Who makes the decisions about when a firm will issue stock, or pay dividends, or re-invest profits? To understand the answers to these questions, it is useful to separate firms into two groups: private and public.

A **private company** is owned by the people who run it on a day-to-day basis. Individuals can run a private company. We call this a **sole proprietorship**. If a group runs it, we call it a partnership. A private company can also be a corporation, but with no publicly issued stock. A small law firm run by one person, even if it employs some other lawyers, would be a sole proprietorship. Partners may jointly own a larger law firm. Most private companies are relatively small, but there are some large private corporations, with tens of billions of dollars in annual sales, that do not have publicly issued stock, such as farm products dealer Cargill, the Mars candy company, and the Bechtel engineering and construction firm.

When a firm decides to sell stock, which financial investors can buy and sell, we call it a public company. Shareholders own a public company. Since the shareholders are a very broad group, often consisting of thousands or even millions of investors, the shareholders vote for a board of directors, who in turn hire top executives to run the firm on a day-to-day basis. The more stock a shareholder owns, the more votes that shareholder is entitled to cast for the company's board of directors.

In theory, the board of directors helps to ensure that the firm runs in the interests of the true owners—the shareholders. However, the top executives who run the firm have a strong voice in choosing the candidates who will serve on their board of directors. After

all, few shareholders are knowledgeable enough or have enough personal incentive to spend energy and money nominating alternative board members.

Watch It

Watch the clip for a brief introduction and explanation of stock markets.

An interactive or media element has been excluded from this version of the text. You can view it online here: http://pb.libretexts.org/mlum/?p=523

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https://assessments.lumenlearning.co...sessments/7604

Glossary

[glossary-page]
[glossary-term]bills:[/glossary-term]
[glossary-definition]short term (less than one year) debt instruments[/glossary-definition]
[glossary-term]bond:[/glossary-term]
[glossary-definition]a financial contract through which a borrower like a corporation, a city or state, or the federal government agrees to repay the amount that it borrowed and also a rate of interest over a period of time in the future; usually long-term (greater than 10 year) debt instruments[/glossary-definition]

[glossary-term]bondholder:[/glossary-term]
[glossary-definition]someone who owns bonds and receives the interest payments[/glossary-definition]

[glossary-term]capital gain:[/glossary-term]
[glossary-definition]a financial gain from buying an asset, like a share of stock or a house, and later selling it at a higher price[/glossary-definition]

[glossary-term]corporation:[/glossary-term]
[glossary-definition]a business owned by shareholders who have limited liability for the company's debt yet a share of the company's profits; may be private or public and may or may not have publicly-traded stock[/glossary-definition]
[glossary-term]debt instruments:[/glossary-term]
[glossary-definition]IOUs[/glossary-definition]

[glossary-term]dividend:[/glossary-term]
[glossary-definition]a direct payment from a firm to its shareholders[/glossary-definition]
[glossary-term]equities or stocks:[/glossary-term]
[glossary-definition]ownership in a private company (unlike debt which conveys no ownership)[/glossary-definition]
[glossary-term]financial markets:[/glossary-term]
[glossary-definition]marketplace where money is invested and borrowed, or in other words, where securities are traded[/glossary-definition]
[glossary-term]initial public offering (IPO):[/glossary-term]
[glossary-definition]original sale of stock by a corporation[/glossary-definition]

[glossary-term]mutual funds:[/glossary-term]
[glossary-definition]funds that buy a range of stocks or bonds from different companies, thus allowing an investor an easy way to diversify[/glossary-definition]
[glossary-term]notes:[/glossary-term]
[glossary-definition]intermediate term (1-10 year) debt instruments[/glossary-definition]

[glossary-term]private company:[/glossary-term]
[glossary-definition]a firm owned by the people who run it on a day-to-day basis[/glossary-definition]

[glossary-term]public company:[/glossary-term]
[glossary-definition]a firm that has sold stock to the public, which in turn investors then can buy and sell[/glossary-definition]
[glossary-term]securities:[/glossary-term]
[glossary-definition]synonym for financial assets, or a certificate or other financial instrument that has monetary value and can be traded. These can be debt securities like bonds or equity securities like stocks. [/glossary-definition]

[glossary-term]shareholders:[/glossary-term]
[glossary-definition]people who own at least some shares of stock in a firm[/glossary-definition]

[glossary-term]shares:[/glossary-term]
[glossary-definition]a firm's stock, divided into individual portions[/glossary-definition]

[glossary-term]sole proprietorship:[/glossary-term]
[glossary-definition]a company run by an individual as opposed to a group[/glossary-definition]

[glossary-term]stock:[/glossary-term]
[glossary-definition]a specific firm's claim on partial ownership[/glossary-definition]

[glossary-term]Treasury bond:[/glossary-term]
[glossary-definition]a bond issued by the federal government through the U.S. Department of the Treasury[/glossary-definition]

[glossary-term]venture capital:[/glossary-term]
[glossary-definition]financial investments in new companies that are still relatively small in size, but that have potential to grow substantially[/glossary-definition]
[/glossary-page]

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12.8: Financial Markets, Supply and Demand, and Interest

Learning Objectives

- Describe types of financial markets and how they are linked
- Explain how market forces determine interest rates in financial markets

Financial markets are made up of a large number of markets for different types of securities: equities, bonds, credit cards, etc. In the market for each asset, supply and demand interact to determine the price and rate of return. Since each financial market is both a source of borrowed funds and a destination for saving, each financial asset is a substitute for every other financial asset (to greater or lesser extent), and thus, all financial markets are linked, directly or indirectly. For example, if the interest rate on U.S. Treasury Bills goes up, you should expect the interest rates on U.S. Treasury notes and bonds to go up a certain extent also. The reason is that if interest rates on Treasury bills increase, that will make bills more attractive to people who normally invest in Treasury notes and bonds. As people shift their savings to bills, the interest rates on notes and bonds will rise.

In this section, we will explore these two features, that asset prices or rates of return are determined by supply and demand, and that all financial markets are linked. These features will help us understand later how monetary policy works.

Who Demands and Who Supplies in Financial Markets?

Financial markets can be analyzed by using the theories of supply and demand. Those who save money (or make financial investments, which is the same thing), whether individuals or businesses, are on the supply side of the financial market. Those who borrow money are on the demand side of the financial market.

In any market, the price is what suppliers receive and what demanders pay. In financial markets, those who supply financial capital through saving expect to receive a rate of return, while those who demand financial capital by receiving funds expect to pay that rate of return. A rate of return can come in a variety of forms, depending on the type of investment.

The simplest example of a rate of return is an **interest rate**. For example, when you put money into a savings account at a bank, you receive interest on your deposit. The interest payment expressed as a percent of your deposits is the interest rate. Similarly, if you demand a loan to buy a car or a computer, you will need to pay interest on the money you borrow.

Let's consider the market for borrowing money with credit cards. In 2015, almost 200 million Americans were cardholders. Credit cards allow you to borrow money from the card's issuer, and pay back the borrowed amount plus interest, although most allow you a period of time in which you can repay the loan without paying interest. A typical credit card interest rate ranges from 12% to 18% per year. In May 2016, Americans had about $943 billion outstanding in credit card debts. About half of U.S. families with credit cards report that they almost always pay the full balance on time, but one-quarter of U.S. families with credit cards say that they "hardly ever" pay off the card in full. In fact, in 2014, 56% of consumers carried an unpaid balance in the last 12 months. Let's say that, on average, the annual interest rate for credit card borrowing is 15% per year. Thus, Americans pay tens of billions of dollars every year in interest on their credit cards—plus basic fees for the credit card or fees for late payments.

Figure 1 illustrates demand and supply in the financial market for credit cards. The horizontal axis of the financial market shows the quantity of money that is loaned or borrowed in this market. The vertical or price axis shows the rate of return, which in the case of credit card borrowing can be measured with an interest rate.Table 1 shows the quantity of financial capital that consumers demand at various interest rates and the quantity that credit card firms (often banks) are willing to supply.

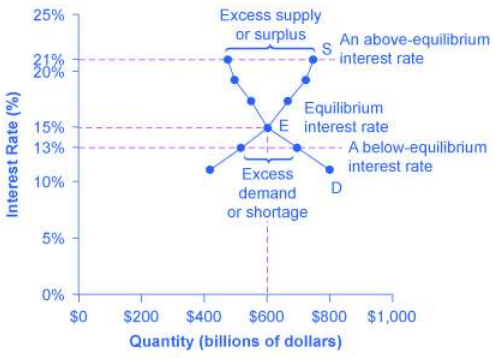


Figure 1. Demand and Supply for Borrowing Money with Credit Cards. In this market for credit card borrowing, the demand curve (D) for borrowing financial capital intersects the supply curve (S) for lending financial capital at equilibrium E. At the equilibrium, the interest rate (the "price" in this market) is 15% and the quantity of financial capital being loaned and borrowed is $600 billion. The equilibrium price is where the quantity demanded and the quantity supplied are equal. At an above-equilibrium interest rate like 21%, the quantity of financial capital supplied would increase to $750 billion, but the quantity demanded would decrease to $480 billion.At a below-equilibrium interest rate like 13%, the quantity of financial capital demanded would increase to $700 billion, but the quantity of financial capital supplied would decrease to $510 billion.

Table 1. Demand and Supply for Borrowing Money with Credit Cards

Interest Rate (%)	Quantity of Financial Capital Demanded (Borrowing) ($ billions)	Quantity of Financial Capital Supplied (Lending) ($ billions)
11	$800	$420
13	$700	$510
15	$600	$600
17	$550	$660
19	$500	$720
21	$480	$750

The laws of demand and supply continue to apply in the financial markets. According to the law of demand, a higher rate of return (that is, a higher price) will decrease the quantity demanded. As the interest rate rises, consumers will reduce the quantity that they borrow. According to the law of supply, a higher price increases the quantity supplied. Consequently, as the interest rate paid on credit card borrowing rises, more firms will be eager to issue credit cards and to encourage customers to use them. Conversely, if the interest rate on credit cards falls, the quantity of financial capital supplied in the credit card market will decrease and the quantity demanded will fall.

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https://assessments.lumenlearning.co...sessments/7606

Equilibrium in Financial Markets

In the financial market for credit cards shown in Figure 1, the supply curve (S) and the demand curve (D) cross at the equilibrium point (E). The equilibrium occurs at an interest rate of 15%, where the quantity of funds demanded and the quantity supplied are equal at an equilibrium quantity of $600 billion.

If the interest rate (remember, this measures the "price" in the financial market) is above the equilibrium level, then an excess supply, or a surplus, of financial capital will arise in this market. For example, at an interest rate of 21%, the quantity of funds supplied increases to $750 billion, while the quantity demanded decreases to $480 billion. At this above-equilibrium interest rate, firms are eager to supply loans to credit card borrowers, but relatively few people or businesses wish to borrow. As a result, some credit card firms will lower the interest rates (or other fees) they charge to attract more business. This strategy will push the interest rate down toward the equilibrium level.

If the interest rate is below the equilibrium, then excess demand or a shortage of funds occurs in this market. At an interest rate of 13%, the quantity of funds credit card borrowers demand increases to $700 billion; but the quantity credit card firms are willing to supply is only $510 billion. In this situation, credit card firms will perceive that they are overloaded with eager borrowers and conclude that they have an opportunity to raise interest rates or fees. The interest rate will face economic pressures to creep up toward the equilibrium level.

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https://assessments.lumenlearning.co...sessments/7607
https://assessments.lumenlearning.co...sessments/7608

Shifts in Demand and Supply in Financial Markets

Those who supply financial capital face two broad decisions: how much to save, and how to divide up their savings among different forms of financial assets. We will discuss each of these in turn.

Participants in financial markets must decide when they prefer to consume goods: now or in the future. Economists call this **intertemporal decision making** because it involves decisions across time. Unlike a decision about what to buy from the grocery store, decisions about investment or saving are made across a period of time, sometimes a long period.

Most workers save for retirement because their income in the present is greater than their needs, while the opposite will be true once they retire. So they save today and supply financial markets. If their income increases, they save more. If their perceived situation in the future changes, they change the amount of their saving. For example, there is some evidence that Social Security, the program that workers pay into in order to qualify for government checks after retirement, has tended to reduce the quantity of financial capital that workers save. If this is true, Social Security has shifted the supply of financial capital at any interest rate to the left.

By contrast, many college students need money today when their income is low (or nonexistent) to pay their college expenses. As a result, they borrow today and demand from financial markets. Once they graduate and become employed, they will pay back the loans. Individuals borrow money to purchase homes or cars. A business seeks financial investment so that it has the funds to build a factory or invest in a research and development project that will not pay off for five years, ten years, or even more. So when consumers and businesses have greater confidence that they will be able to repay in the future, the quantity demanded of financial capital at any given interest rate will shift to the right.

For example, in the technology boom of the late 1990s, many businesses became extremely confident that investments in new technology would have a high rate of return, and their demand for financial capital shifted to the right. Conversely, during the Great Recession of 2008 and 2009, their demand for financial capital at any given interest rate shifted to the left.

To this point, we have been looking at saving in total. Now let us consider what affects saving in different types of financial investments. In deciding between different forms of financial investments, suppliers of financial capital will have to consider the rates of return and the risks involved. Rate of return is a positive attribute of investments, but risk is a negative. If Investment A (say, stock in a struggling corporation) becomes more risky, or the return diminishes, then savers will shift their funds to Investment B (say, U.S. Treasury bonds)—and the supply curve of financial capital for Investment A will shift back to the left while the supply curve of capital for Investment B shifts to the right.

The United States as a Global Borrower

In the global economy, trillions of dollars of financial investment cross national borders every year. In the early 2000s, financial investors from foreign countries were investing several hundred billion dollars per year more in the U.S. economy than U.S. financial investors were investing abroad. The following feature, which should look familiar from the earlier module “Applications of Supply and Demand,” deals with one of the macroeconomic concerns for the U.S. economy in recent years.

THE EFFECT OF GROWING U.S. DEBT

Imagine that the U.S. economy became viewed as a less desirable place for foreign investors to put their money because of fears about the growth of the U.S. public debt. How would this change in perceptions about the desirability of investments in U.S. public debt affect the equilibrium price and quantity for capital in U.S. financial markets?

Step 1. First, we will draw a diagram showing demand and supply for financial capital that represents the original scenario in which foreign investors are pouring money into the U.S. economy. Figure 1 shows a demand curve, D, and a supply curve, S, where the supply of capital includes the funds arriving from foreign investors. The original equilibrium E_0 occurs at interest rate R_0 and quantity of financial investment Q_0.

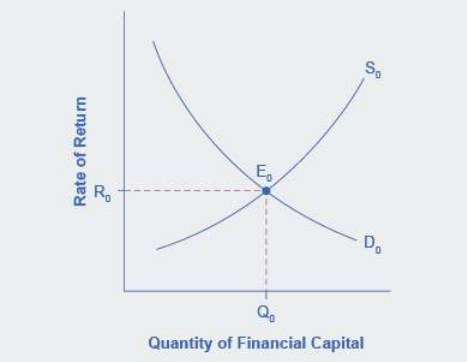


Figure 2.The United States as a Global Borrower Before U.S. Debt Uncertainty. The graph shows the demand for financial capital from and supply of financial capital into the U.S. financial markets by the foreign sector before the increase in uncertainty regarding U.S. public debt. The original equilibrium (E_0) occurs at an equilibrium rate of return (R_0) and the equilibrium quantity is at Q_0.

Step 2. Will the diminished confidence in the U.S. economy as a place to invest affect demand or supply of financial capital?

[reveal-answer q="592867"]Show Answer[/reveal-answer]
[hidden-answer a="592867"]Yes, it will affect supply. Many foreign investors look to the U.S. financial markets to store their money in safe financial vehicles with low risk and stable returns. As the U.S. debt increases, debt servicing will increase—that is, more current income will be used to pay the interest rate on past debt. Increasing U.S. debt also means that businesses may have to pay higher interest rates to borrow money, because business is now competing with the government for financial resources. [/hidden-answer]

Step 3. Will supply increase or decrease?

[reveal-answer q="591653"]Show Answer[/reveal-answer]
[hidden-answer a="591653"]

When the enthusiasm of foreign investors' for investing their money in the U.S. economy diminishes, the supply of financial capital shifts to the left. Figure 3 shows the supply curve shift from S_0 to S_1.

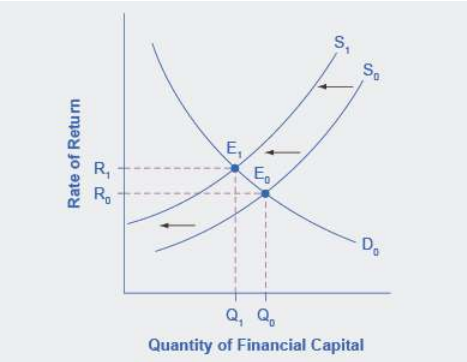


Figure 3. The United States as a Global Borrower Before and After U.S. Debt Uncertainty. The graph shows the demand for financial capital and supply of financial capital into the U.S. financial markets by the foreign sector before and after the increase in uncertainty regarding U.S. public debt. The original equilibrium (E_0) occurs at an equilibrium rate of return (R_0) and the equilibrium quantity is at Q_0.

[/hidden-answer]

Step 4. What does this mean for U.S. financial markets?

[reveal-answer q="765316"]Show Answer[/reveal-answer]
[hidden-answer a="765316"]Foreign investors' diminished enthusiasm leads to a new equilibrium, E_1, which occurs at the higher interest rate, R_1, and the lower quantity of financial investment, Q_1.[/hidden-answer]

The economy has experienced an enormous inflow of foreign capital. According to the U.S. Bureau of Economic Analysis, by the third quarter of 2014, U.S. investors had accumulated $24.6 trillion of foreign assets, but foreign investors owned a total of $30.8 trillion of U.S. assets. If foreign investors were to pull their money out of the U.S. economy and invest elsewhere in the world, the result could be a significantly lower quantity of financial investment in the United States, available only at a higher interest rate. This reduced inflow of foreign financial investment could impose hardship on U.S. consumers and firms interested in borrowing.

In a modern, developed economy, financial capital often moves invisibly through electronic transfers between one bank account and another. Yet these flows of funds can be analyzed with the same tools of demand and supply as markets for goods or labor.

Try It

These questions allow you to get as much practice as you need, as you can click the link at the top of the first question ("Try another version of these questions") to get a new set of questions. Practice until you feel comfortable doing the questions.

[ohm_question]153727-153729-153730[/ohm_question]

Glossary

[glossary-page]
[glossary-term]interest rate:[/glossary-term]
[glossary-definition]the "price" of borrowing in the financial market; a rate of return on an investment[/glossary-definition]
[glossary-term]intertemporal decision making: [/glossary-term]
[glossary-definition]the study of how people make choices about what and how much to do at various points in time; when choices at one time influence the possibilities available at other points in time[/glossary-definition][/glossary-page]

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12.9: Introduction to Banking

What you'll learn to do: explain what a bank does



A nation's banking system consists of commercial banks and similar financial institutions, and a central bank, which regulates commercial banks and the availability of credit. In the United States, the central bank is the called the Federal Reserve System, which we will discuss in detail in the next module.

In this section, you will examine the role of banks and understand the purpose they serve in the economy.

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12.10: The Commercial Banking System

Learning Objectives

- Explain how banks act as intermediaries between savers and borrowers
- Differentiate between banks and credit unions

The Role of Banks

The late bank robber named Willie Sutton was once asked why he robbed banks. He answered: “That’s where the money is.” While this may have been true at one time, from the perspective of modern economists, Sutton is both right and wrong. He is wrong because the overwhelming majority of money in the economy is not in the form of currency sitting in vaults or drawers at banks, waiting for a robber to appear. Most money is in the form of bank accounts, which exist only as electronic records on computers. From a broader perspective, however, the bank robber was more right than he may have known. Banking is intimately interconnected with money and consequently, with the broader economy.

Banks play two key roles in the functioning of the economy, first by facilitating the payments system and second by serving as financial intermediaries.

Banks are a critical intermediary in what is called the **payments system**, which helps an economy exchange goods and services for money or other financial assets. Banks make it far easier for a complex economy to carry out the extraordinary range of transactions that occur in goods, labor, and financial capital markets. Imagine for a moment what the economy would be like if all payments had to be made in cash. When shopping for a large purchase or going on vacation you might need to carry hundreds of dollars in a pocket or purse. Even small businesses would need stockpiles of cash to pay workers and to purchase supplies. A bank allows people and businesses to store this money in either a checking account or savings account, for example, and then withdraw this money as needed through the use of a cash withdrawal, writing a check, using a debit card, or some other form of electronic payment.

Watch IT

Watch this video to the see a simplified model of how banks work and how they earn money.

An interactive or media element has been excluded from this version of the text. You can view it online here: http://pb.libretexts.org/mlum/?p=529

Banks as Financial Intermediaries

Banks are a convenient place to store one’s savings, rather than looking for a person or business that is willing to borrow from them and then repay them at a later date. **Transaction costs** are the costs associated with finding a lender or a borrower for this money. Thus, banks lower transactions costs and act as financial intermediaries—they bring savers and borrowers together. Along with making transactions much safer and easier, banks also play a key role in the creation of money.

An “intermediary” is one who stands between two other parties. Banks are a **financial intermediary**—that is, an institution that operates between a saver who deposits money in a bank and a borrower who receives a loan from that bank. All the funds deposited are mingled in one big pool, which is then loaned out. Figure 1 illustrates the position of banks as financial intermediaries, with deposits flowing into a bank and loans flowing out. Of course, when banks make loans to firms, the banks will try to funnel financial capital to healthy businesses that have good prospects for repaying the loans, not to firms that are suffering losses and may be unable to repay.

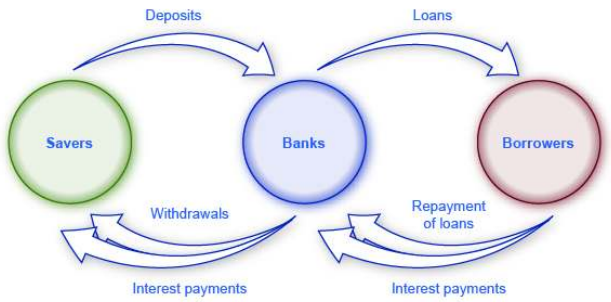


Figure 1. Banks as Financial Intermediaries. Banks act as financial intermediaries because they stand between savers and borrowers. Savers place deposits with banks, and then receive interest payments and withdraw money. Borrowers receive loans from banks and repay the loans with interest. In turn, banks return money to savers in the form of withdrawals, which also include interest payments from banks to savers.

Financial intermediaries include other institutions in the financial market such as insurance companies and pension funds, but they are not included in this discussion because they are not considered to be **depository institutions**, which are institutions that accept money deposits and then use these to make loans.

Banks offer a range of accounts to serve different needs. A **checking account** typically pays little or no interest, but it facilitates transactions by giving you easy access to your money, either by writing a check or by using a **debit card** (that is, a card which works like a credit card, except that purchases are immediately deducted from your checking account rather than billed separately through a credit card company). A **savings account** typically pays some interest rate, but getting the money typically requires you to make a trip to the bank or an automatic teller machine (or you can access the funds electronically). The lines between checking and savings accounts have blurred in the last couple of decades, as many banks offer checking accounts that will pay an interest rate similar to a savings account if you keep a certain minimum amount in the account, or conversely, offer savings accounts that allow you to write at least a few checks per month.

Another way to deposit savings at a bank is to use a **certificate of deposit (CD)**. With a CD, you agree to deposit a certain amount of money in the account for a fixed period of time, typically ranging from a few months to several years. In exchange, the bank agrees to pay a higher interest rate than for a regular savings account. While you can withdraw the money before the allotted time, as the advertisements for CDs always warn, there is "a substantial penalty for early withdrawal."

Figure 1 shows the annual rate of interest paid on six-month, one-year, and five-year CDs since 1984, as reported by Bankrate.com. The interest rates that savings accounts pay are typically a little lower than the CD rate, because financial investors need to receive a slightly higher rate of interest as compensation for promising to leave deposits untouched for a period of time in a CD, and thus forfeiting some liquidity.

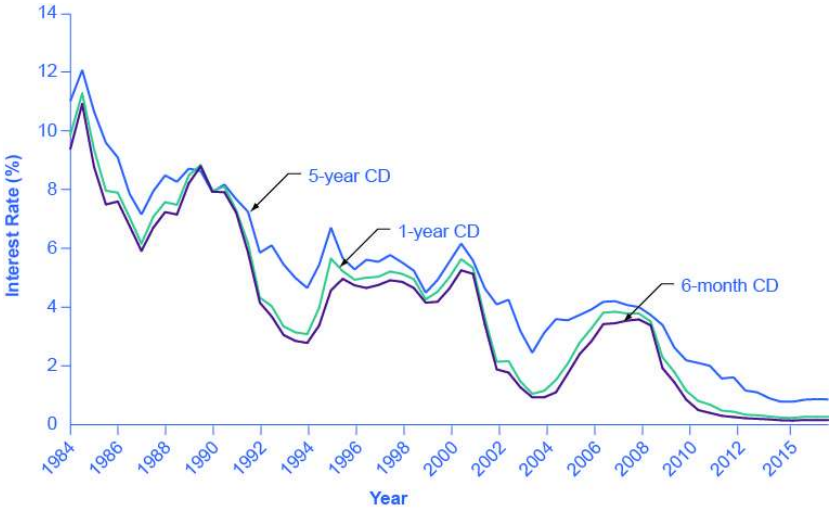


Figure 2. CD Interest Rates. The interest rates on certificates of deposit have fluctuated over time. The high interest rates of the early 1980s are indicative of the relatively high inflation rate in the United States at that time. Interest rates fluctuate with the business cycle, typically increasing during expansions and decreasing during a recession. Note the steep decline in CD rates since 2008, the beginning of the Great Recession.

The great advantages of bank accounts are that financial investors have very easy access to their money, and also money in bank accounts is extremely safe. In part, this safety arises because a bank account offers more security than keeping a few thousand dollars in the toe of a sock in your underwear drawer. In addition, the Federal Deposit Insurance Corporation (FDIC) protects the savings of the average person. Every bank is required by law to pay a fee to the FDIC, based on the size of its deposits. Then, if a bank should go bankrupt and not be able to repay depositors, the FDIC guarantees that all customers will receive their deposits back up to $250,000.

The bottom line on bank accounts looks like this: low risk means low rate of return but high liquidity.

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https://assessments.lumenlearning.co...sessments/7610

HOW ARE BANKS, SAVINGS AND LOANS, AND CREDIT UNIONS RELATED?

Banks have a couple of close cousins: savings institutions and credit unions. Banks, as explained, receive deposits from individuals and businesses and make loans with the money. Savings institutions are also sometimes called "savings and loans" (S&L) or "thrifts." They also take loans and make deposits. However, from the 1930s until the 1980s, federal law limited how much interest savings institutions were allowed to pay to depositors. They were also required to make most of their loans in the form of housing-related loans, either to homebuyers or to real-estate developers and builders.

A **credit union** is a nonprofit financial institution that its members own and run. Members of each credit union decide who is eligible to be a member. Usually, potential members would be everyone in a certain community, or groups of employees, or members of a certain organization. The credit union accepts deposits from members and focuses on making loans back to its members. While there are more credit unions than banks

and more banks than savings and loans, the total assets of credit unions are growing. Both credit unions and savings institutions are considered depository institutions.

In 2008, there were 7,085 banks. Due to the bank failures of 2007–2009 and bank mergers, there were 5,571 banks in the United States at the end of the fourth quarter in 2014. According to the Credit Union National Association, as of December 2014 there were 6,535 credit unions with assets totaling $1.1 billion. A day of "Transfer Your Money" took place in 2009 out of general public disgust with big bank bailouts. People were encouraged to transfer their deposits to credit unions. This has grown into the ongoing Move Your Money Project (watch a video about the project and competition between big banks and smaller community banks here). Consequently, some now hold deposits as large as $50 billion. However, as of 2013, the 12 largest banks (0.2%) controlled 69 percent of all banking assets, according to the Dallas Federal Reserve.

Try It

https://assessments.lumenlearning.co...sessments/7611

Glossary

[glossary-page][glossary-term]checking account: [/glossary-term]
[glossary-definition]a bank account that typically pays little or no interest, but that gives easy access to money, either by writing a check or by using a "debit card"[/glossary-definition][glossary-term]credit union: [/glossary-term]
[glossary-definition]a nonprofit financial institution that its members own and run[/glossary-definition][glossary-term]debit card: [/glossary-term]
[glossary-definition]a card that lets the person make purchases, and the financial institution immediately deducts cost from that person's checking account[/glossary-definition][glossary-term]depository institution: [/glossary-term][glossary-definition]institution that accepts money deposits and then uses these to make loans[/glossary-definition][glossary-term]financial intermediary: [/glossary-term]
[glossary-definition]an institution that operates between a saver with financial assets to invest and an entity who will borrow those assets and pay a rate of return[/glossary-definition][glossary-term]payments system:[/glossary-term][glossary-definition]system by which buyers and sellers exchange money for goods, services and financial capital.[/glossary-definition][glossary-term]savings account: [/glossary-term]
[glossary-definition]a bank account that pays an interest rate, but withdrawing money typically requires a trip to the bank or an automatic teller machine[/glossary-definition][glossary-term]transaction costs: [/glossary-term][glossary-definition]the costs associated with finding a lender or a borrower for money[/glossary-definition]
[/glossary-page]

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12.11: Banking Assets and Liabilities

Learning Objectives

- Describe a bank's assets and liabilities in a T-account
- Analyze the causes of bankruptcy and recessions

A Bank's Balance Sheet

A **balance sheet** is an accounting tool that lists assets and liabilities. An **asset** is something of value that is owned and can be used to produce something. For example, the cash you own can be used to pay your tuition. A home provides shelter and can be rented out to generate income. A **liability** is a debt or something you owe. Many people borrow money to buy homes. In this case, the home is the asset, but the mortgage (i.e. the loan obtained to purchase the home) is the liability. The **net worth** is the asset value minus how much is owed (the liability). A bank's balance sheet operates in much the same way. A bank's net worth is also referred to as **bank capital**. A bank has assets such as cash held in its vaults and monies that the bank holds at the Federal Reserve bank (called "reserves"), loans that are made to customers, and bonds.

Figure 1 illustrates a hypothetical and simplified balance sheet for the Safe and Secure Bank. Because of the two-column format of the balance sheet, with the T-shape formed by the vertical line down the middle and the horizontal line under "Assets" and "Liabilities," it is sometimes called a **T-account**.

Assets		Liabilities + Net Worth	
Loans	$5 million	Deposits	$10 million
U.S. Government Securities (USGS)	$4 million		
Reserves	$2 million	Net Worth	$1 million

Figure 1. A Balance Sheet for the Safe and Secure Bank

The "T" in a T-account separates the assets of a firm, on the left, from its liabilities, on the right. All firms use T-accounts, though most are much more complex. For a bank, the assets are the financial instruments that either the bank is holding (its reserves) or those instruments where other parties owe money to the bank—like loans made by the bank and U.S. government securities, such as U.S. Treasury bonds purchased by the bank. Liabilities are what the bank owes to others. Specifically, the bank owes any deposits made in the bank to those who have made them. The net worth, or equity, of the bank is the total assets minus total liabilities. Net worth is included on the liabilities side to have the T account balance to zero. For a healthy business, net worth will be positive. For a bankrupt firm, net worth will be negative. In either case, on a bank's T-account, assets will always equal liabilities plus net worth.

When bank customers deposit money into a checking account, savings account, or a certificate of deposit, the bank views these deposits as liabilities. After all, the bank owes these deposits to its customers, and are obligated to return the funds when the customers wish to withdraw their money. In the example shown in Figure 1, the Safe and Secure Bank holds $10 million in deposits.

Loans are the first category of bank assets shown in Figure 1. Say that a family takes out a 30-year mortgage loan to purchase a house, which means that the borrower will repay the loan over the next 30 years. This loan is clearly an asset from the bank's perspective, because the borrower has a legal obligation to make payments to the bank over time. But in practical terms, how can the value of the mortgage loan that is being paid over 30 years be measured in the present? One way of measuring the value of something—whether a loan or anything else—is by estimating what another party in the market is willing to pay for it. Many banks issue home loans, and charge various handling and processing fees for doing so, but then sell the loans to other banks or financial institutions who collect the loan payments. The market where loans are made to borrowers is called the primary **loan market**, while the market in which these loans are bought and sold by financial institutions is the secondary loan market.

One key factor that affects what financial institutions are willing to pay for a loan, when they buy it in the secondary loan market, is the perceived riskiness of the loan: that is, given the characteristics of the borrower, such as income level and whether the local economy is performing strongly, what proportion of loans of this type will be repaid? The greater the risk that a loan will not be repaid, the less that any financial institution will pay to acquire the loan. Another key factor is to compare the interest rate charged on the original loan with the current interest rate in the economy. If the original loan made at some point in the past requires the borrower to pay a low interest rate, but current interest rates are relatively high, then a financial institution will pay less to acquire the loan. In contrast, if the original loan requires the borrower to pay a high interest rate, while current interest rates are relatively low, then a financial institution will pay more to acquire the loan. For the Safe and Secure Bank in this example, the total value of its loans if they were sold to other financial institutions in the secondary market is $5 million.

The second category of bank asset is **Treasury securities**, which are a common mechanism for borrowing used by the federal government. Treasury securities include short term bills, intermediate term notes and long term bonds. A bank takes some of the money it has received in deposits and uses the money to buy bonds—typically bonds issued by the U.S. government. Government bonds are low-risk because the government is virtually certain to pay off the bond, albeit at a low rate of interest. These bonds are an asset for banks in the same way that loans are an asset: The bank will receive a stream of payments in the future. In our example, the Safe and Secure Bank holds bonds worth a total value of $4 million.

The final entry under assets is **reserves**, which is money that the bank keeps on hand, and that is not loaned out or invested in bonds—and thus does not lead to interest payments. The Federal Reserve requires that banks keep a certain percentage of depositors' money on "reserve," which means either in the banks' own vaults or as deposits kept at the Federal Reserve Bank. This is called a reserve requirement. (Later, when you learn more about monetary policy, you will see that the level of these required reserves is one policy tool that governments have to influence bank behavior.) Additionally, banks may also want to keep a certain amount of reserves on hand in excess of what is required. The Safe and Secure Bank is holding $2 million in reserves.

The net worth of a bank is defined as its total assets minus its total liabilities. For the Safe and Secure Bank shown in Figure 1, net worth is equal to $1 million; that is, $11 million in assets minus $10 million in liabilities. For a financially healthy bank, the net worth will be positive. If a bank has negative net worth and depositors tried to withdraw their money, the bank would not be able to give all depositors their money.

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How Banks Go Bankrupt

A bank that is bankrupt will have a negative net worth, meaning its assets will be worth less than its liabilities. How can this happen? Again, looking at the balance sheet helps to explain.

A well-run bank will assume that a small percentage of borrowers will not repay their loans on time, or at all, and factor these missing payments into its planning. Remember, the calculations of the expenses of banks every year includes a factor for loans that are not repaid, and the value of a bank's loans on its balance sheet assumes a certain level of riskiness because some loans will not be repaid. Even if a bank expects a certain number of loan defaults, it will suffer if the number of loan defaults is much greater than expected, as can happen during a recession. For example, if the Safe and Secure Bank in Figure 1 experienced a wave of unexpected defaults, so that its loans declined in value from $5 million to $3 million, then the assets of the Safe and Secure Bank would decline so that the bank had a negative net worth.

WHAT LED TO THE FINANCIAL CRISIS OF 2008–2009?

Many banks make mortgage loans so that people can buy a home, but then do not keep the loans on their books as an asset. Instead, the bank sells the loan. These loans are often "securitized," which means that they are bundled together into a financial security that is sold to investors. Investors in these mortgage-backed securities receive a rate of return based on the level of payments that people make on all the mortgages that stand behind the security.

Securitization offers certain advantages. If a bank makes most of its loans in a local area, then the bank may be financially vulnerable if the local economy declines, so that many people are unable to make their payments. But if a bank sells its local loans, and then buys a mortgage-backed security based on home loans in many parts of the country, it can avoid being exposed to local financial risks. (In the simple example in the text, banks just own "bonds." In reality, banks can own a number of financial instruments, as long as these financial investments are safe enough to satisfy the government bank regulators.) From the standpoint of a local homebuyer, securitization offers the benefit that a local bank does not need to have lots of extra funds to make a loan, because the bank is only planning to hold that loan for a short time, before selling the loan so that it can be pooled into a financial security.

But securitization also offers one potentially large disadvantage. If a bank is going to hold a mortgage loan as an asset, the bank has an incentive to scrutinize the borrower carefully to ensure that the loan is likely to be repaid. However, a bank that is going to sell the loan may be less careful in making the loan in the first place. The bank will be more willing to make what are called "subprime loans," which are loans that have characteristics like low or zero down-payment, little scrutiny of whether the borrower has a reliable income, and sometimes low payments for the first year or two that will be followed by much higher payments after that. Some **subprime loans** made in the mid-2000s were later dubbed NINJA loans: loans made even though the borrower had demonstrated No Income, No Job, nor Assets.

These subprime loans were typically sold and turned into financial securities—but with a twist. The idea was that if losses occurred on these mortgage-backed securities, certain investors would agree to take the first, say, 5% of such losses. Other investors would agree to take, say, the next 5% of losses. By this approach, still other investors would not need to take any losses unless these mortgage-backed financial securities lost 25% or 30% or more of their total value. These complex securities, along with other economic factors, encouraged a large expansion of subprime loans in the mid-2000s.

The economic stage was now set for a banking crisis. Banks thought they were buying only ultra-safe securities, because even though the securities were ultimately backed by risky subprime mortgages, the banks only invested in the part of those securities where they were protected from small or moderate levels of losses. But as housing prices fell after 2007, and the deepening recession made it harder for many people to make their mortgage payments, many banks found that their mortgage-backed financial assets could end up being worth much less than they had expected—and so the banks were staring bankruptcy in the face. In the 2008–2011 period, 318 banks failed in the United States.

Loan Defaults

The risk of an unexpectedly high level of loan defaults can be especially difficult for banks because a bank's liabilities, namely the deposits of its customers, can be withdrawn quickly, but many of the bank's assets like loans and bonds will only be repaid over years or even decades. This **asset-liability time mismatch**—a bank's liabilities can be withdrawn in the short term while its assets are repaid in the long term—can cause severe problems for a bank. For example, imagine a bank that has loaned a substantial amount of money at a certain interest rate, but then sees interest rates rise substantially. The bank can find itself in a precarious situation. If it does not raise the interest rate it pays to depositors, then deposits will flow to other institutions that offer the higher interest rates that are now prevailing. However, if the bank raises the interest rates that it pays to depositors, it may end up in a situation where it is paying a higher interest rate to depositors than it is collecting from those past loans that were made at lower interest rates. Clearly, the bank cannot survive in the long term if it is paying out more in interest to depositors than it is receiving from borrowers.

How can banks protect themselves against an unexpectedly high rate of loan defaults and against the risk of an asset-liability time mismatch? One strategy is for a bank to **diversify** its loans, which means lending to a variety of customers. For example, suppose a bank specialized in lending to a niche market—say, making a high proportion of its loans to construction companies that build offices in one downtown area. If that one area suffers an unexpected economic downturn, the bank will suffer large losses. However, if a bank loans both to consumers who are buying homes and cars and also to a wide range of firms in many industries and geographic areas, the bank is less exposed to risk. When a bank diversifies its loans, those categories of borrowers who have an unexpectedly large number of defaults will tend to be balanced out, according to random chance, by other borrowers who have an unexpectedly low number of defaults. Thus, diversification of loans can help banks to keep a positive net worth. However, if a widespread recession occurs that touches many industries and geographic areas, diversification will not help.

Along with diversifying their loans, banks have several other strategies to reduce the risk of an unexpectedly large number of loan defaults. For example, banks can sell some of the loans they make in the secondary loan market, as described earlier, and instead hold a greater share of assets in the form of government bonds or reserves. Nevertheless, in a lengthy recession, most banks will see their net worth decline because a higher share of loans will not be repaid in tough economic times.

Money and Banks—Benefits and Dangers

Money and banks are marvelous social inventions that help a modern economy to function. Compared with the alternative of barter, money makes market exchanges vastly easier in goods, labor, and financial markets. Banking makes money still more effective in facilitating exchanges in goods and labor markets. Moreover, the process of banks making loans in financial capital markets is intimately tied to the creation of money.

However, the extraordinary economic gains that are possible through money and banking also suggest some possible corresponding dangers. If banks are not working well, it sets off a decline in convenience and safety of transactions throughout the economy. If the banks are under financial stress, because of a widespread decline in the value of their assets, loans may become far less available, which can deal a crushing blow to sectors of the economy that depend on borrowed money like business investment, home construction, and car manufacturing. The 2008–2009 Great Recession illustrated this pattern.

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[ohm_question]153761-153762[/ohm_question]

Glossary

[glossary-page][glossary-term]asset: [/glossary-term]
[glossary-definition]item of value that a firm or an individual owns[/glossary-definition][glossary-term]asset–liability time mismatch:[/glossary-term]
[glossary-definition]customers can withdraw a bank's liabilities in the short term while customers repay its assets in the long term[/glossary-definition][glossary-term]balance sheet:[/glossary-term]

[glossary-definition]an accounting tool that lists assets and liabilities[/glossary-definition][glossary-term]bank capital:[/glossary-term]
[glossary-definition]a bank's net worth[/glossary-definition][glossary-term]diversify:[/glossary-term][glossary-definition]making loans or investments with a variety of firms, to reduce the risk of being adversely affected by events at one or a few firms[/glossary-definition][glossary-term]liability:[/glossary-term]
[glossary-definition]any amount or debt that a firm or an individual owes[/glossary-definition][glossary-term]net worth:[/glossary-term]
[glossary-definition]the excess of the asset value over and above the amount of the liability; total assets minus total liabilities[/glossary-definition][glossary-term]reserves:[/glossary-term]
[glossary-definition]funds that a bank keeps on hand and that it does not loan out or invest in bonds[/glossary-definition][glossary-term]T-account:[/glossary-term]
[glossary-definition]a balance sheet with a two-column format, with the T-shape formed by the vertical line down the middle and the horizontal line under the column headings for "Assets" and "Liabilities"[/glossary-definition][glossary-term]Treasury securities:[/glossary-term]
[glossary-definition]government debt obligations in which the government sells short term bills, intermediate term notes and long term bonds to raise money[/glossary-definition][/glossary-page]

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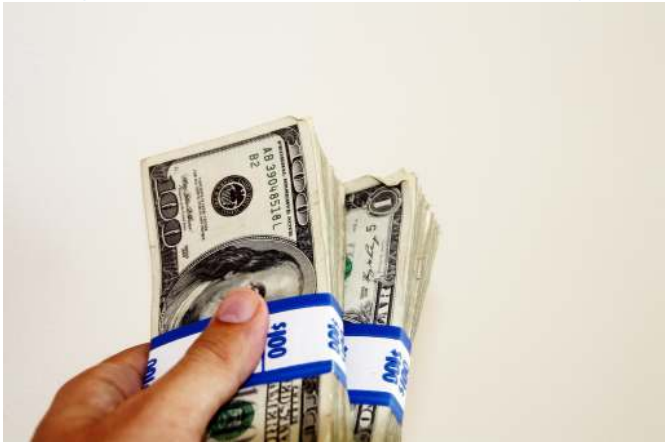
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12.12: Introduction to Lending and Money Creation

What you'll learn to do: describe how money is created by lending



In this section, you will see how banks can actually create money through loans. Money that is deposited in a bank is lent out, then a portion of that may be re-deposited elsewhere, then that money will be lent out, and that money re-deposited elsewhere, and so on. This process results in an increase of the money supply.

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12.13: How Banks Create Money

Learning Objectives

- Explain and show how banks create money
- Use the money multiplier formula to calculate how banks create money

Money Creation by a Single Bank

Banks and money are intertwined. It is not just that most money is in the form of bank accounts. The banking system can literally create money through the process of making loans. Let's see how.

Start with a hypothetical bank called Singleton Bank. The bank has $10 million in deposits. The T-account balance sheet for Singleton Bank, when it holds all of the deposits in its vaults, is shown in Figure 1. At this stage, Singleton Bank is simply storing money for depositors; it is not using these deposits to make loans, so it cannot pay its depositors interest either.

Assets		Liabilities + Net Worth	
Reserves	$10 million	Deposits	$10 million

Figure 1. Singleton Bank's Balance Sheet: Receives $10 million in Deposits.

Singleton Bank is required by the Federal Reserve to keep 10% of total deposits, or $1 million, on reserve to cover withdrawals. It will loan out the remaining $9 million. By loaning out the $9 million and charging interest, it will be able to make interest payments to depositors and earn interest income for Singleton Bank and make interest payments to depositors (for now, we will keep it simple and not put interest income on the balance sheet). Instead of becoming just a storage place for deposits, Singleton Bank can become a financial intermediary between savers and borrowers.

This change in business plan alters Singleton Bank's balance sheet, as shown in Figure 2. Singleton's assets have changed; it now has $1 million in reserves and a loan to Hank's Auto Supply of $9 million. The bank still has $10 million in deposits.

Assets		Liabilities + Net Worth	
Reserves	$1 million	Deposits	$10 million
Loan to Hank's Auto Supply	$9 million		

Figure 2. Singleton Bank's Balance Sheet: 10% Reserves, One Round of Loans

Singleton Bank lends $9 million to Hank's Auto Supply. The bank records this loan by making an entry on the balance sheet to indicate that a loan has been made. This loan is an asset, because it will generate interest income for the bank. Of course, the loan officer is not going to let Hank walk out of the bank with $9 million in cash. The bank issues Hank's Auto Supply a cashier's check for the $9 million. Hank deposits the loan in his regular checking account with First National. The deposits at First National rise by $9 million and its reserves also rise by $9 million, as Figure 3 shows. First National must hold 10% of additional deposits as required reserves but is free to loan out the rest.

Assets		Liabilities + Net Worth	
Reserves	+ $9 million	Deposits	+ $9 million

Figure 3. First National Bank's Balance Sheet: Required 10% Reserves

Since the loan to Hank was deposited into a demand deposit account (Hank's checking account), the loan increases the M1 money supply. Making loans that are deposited into a demand deposit account increases the M1 money supply. Remember the definition of M1 includes checkable (demand) deposits, which can be easily used as a medium of exchange to buy goods and services. Notice that the money supply is now $19 million: $10 million in deposits in Singleton bank and $9 million in deposits at First National. Obviously these deposits will be drawn down as Hank's Auto Supply writes checks to pay its bills, but as long as those checks are deposited in other checking accounts, the effect is the same. The bottom line is that a bank must hold enough money to meet its reserve requirement; the rest the bank loans out, and those loans, when deposited, add to the money supply. In this example so far, bank lending has expanded the money supply by $9 million.

Now, First National must hold only 10% as required reserves ($90,000) but can lend out the other 90% ($8.1 million) in a loan to Jack's Chevy Dealership as shown in Figure 4.

Assets		Liabilities + Net Worth	
Reserves	$90,000	Deposits	+ $9 million
Loans	$8.1 million		

Figure 4. First National Balance Sheet

If Jack's deposits the loan in its checking account at Second National, the money supply just increased by an additional $8.1 million, as Figure 5 shows.

Assets		Liabilities + Net Worth	
Reserves	+ $8.1 million	Deposits	+ $8.1 million

Figure 5. Second National Bank's Balance Sheet

How is this money creation possible? It is possible because there are multiple banks in the financial system, they are required to hold only a fraction of their deposits, and loans end up deposited in other banks, which increases deposits and, in essence, the money supply.

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https://assessments.lumenlearning.co...sessments/7617

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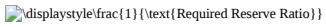
This video explains how banks use deposits and loans to create money.

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The Money Multiplier in a Multi-Bank System

In a system with multiple banks, the initial excess reserve amount that Singleton Bank decided to lend to Hank's Auto Supply was deposited into First National Bank, which is free to loan out $8.1 million. If all banks loan out their excess reserves, the money supply will expand. In a multi-bank system, the amount of money that the system can create is found by using the money multiplier. The money multiplier tells us by how many times a loan will be "multiplied" through the process of lending out excess reserves, which are deposited in banks as demand deposits. Thus, the money multiplier is the ratio of the change in money supply to the initial change in bank reserves.

Fortunately, a formula exists for calculating the total of these many rounds of lending in a banking system. The **money multiplier formula** is:

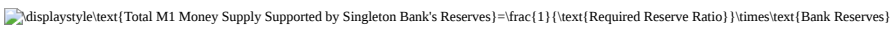


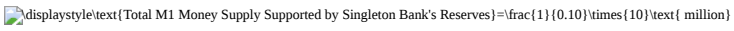
USING THE MONEY MULTIPLIER FORMULA

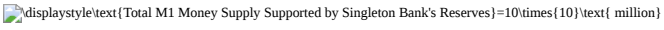
Using the money multiplier for the example from Singleton Bank above in this text:

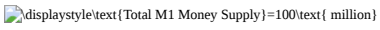
Step 1. In this example, the reserve requirement is 10% (or 0.10), so the money multiplier is 1 divided by 0.10, which is equal to 10.

Step 2. Since Singleton Bank initially has reserves of $10 million, using the formula we can determine the potential amount of new money created by that deposit:



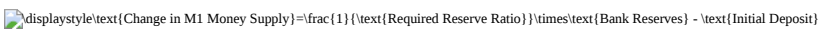


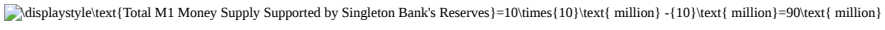




Step 3. Thus, we can say that, in this example, after all rounds of lending are completed, Singleton Bank's initial reserves of $10 million will support $100 million in M1 Money Supply.

Step 4. Since initially Singleton Bank started with $10 million in demand deposits (which means that $10 million was already counted in the money supply), we subtract that initial amount from the total.





So the loan expansion process from Singleton Bank's Deposit was able to create $90 million in new deposits/money supply.

Note that when we talk about changes in the M1 money supply, it makes a difference whether the change in deposits comes from people depositing currency or from the Federal Reserve.

If a person takes currency and deposits it into their checking account, their bank holds the required reserves and then lends out the rest, spurring the loan expansion process. The change in the money supply needs to take into account that the currency was already part of M1 and shouldn't be counted again.

Thus, the change in the M1 money supply will be the change in deposits multiplied by the money multiplier minus the decrease in currency held that was deposited in the bank (as shown in this example with Singleton Bank).

Let's look at another example. Suppose Carla deposits $50 in cash into her checking account. The $50 cash was already part of the money supply. If the required reserve ratio is 10%, the money multiplier will be 1/10% = 1/0.10 = 10. Carla's bank keeps $5 of her deposit as required

reserves and loans out the rest. When the loan expansion process in the banking system is complete, the total change in the M1 money supply is 10 times $50 minus the $50 currency that Carla moved from currency to her bank account.

$$\text{Change in M1 Money Supply} = 10 \times \$50 = \$500 - \$50 = \$450$$

In the module on monetary policy, we will explain how when the Federal Reserve conducts expansionary monetary policy (ie. purchasing Treasury bonds), the change in deposits comes from *outside* the financial system. In that case, the change in the money supply will equal the change in deposits times the money multiplier. Since there is no change in currency holdings, we don't subtract the amount of the initial deposit.

Cautions about the Money Multiplier

The money multiplier will depend on the proportion of reserves that banks are required to hold by the Federal Reserve Bank. Additionally, a bank can also choose to hold extra reserves. Banks may decide to vary how much they hold in reserves for two reasons: macroeconomic conditions and government rules. When an economy is in recession, banks are likely to hold a higher proportion of reserves because they fear that loans are less likely to be repaid when the economy is slow. The Federal Reserve may also raise or lower the required reserves held by banks as a policy move to affect the quantity of money in an economy, as we will discuss in more depth in the module on monetary policy.

The process of how banks create money shows how the quantity of money in an economy is closely linked to the quantity of lending or credit in the economy. Indeed, all of the money in the economy, except for the original reserves, is a result of bank loans that are re-deposited and loaned out, again, and again.

Finally, the money multiplier depends on people re-depositing the money that they receive in the banking system. If people instead store their cash in safe-deposit boxes or in shoeboxes hidden in their closets, then banks cannot recirculate the money in the form of loans. Indeed, central banks have an incentive to assure that bank deposits are safe because if people worry that they may lose their bank deposits, they may start holding more money in cash, instead of depositing it in banks, and the quantity of loans in an economy will decline. Low-income countries have what economists sometimes refer to as "mattress savings," or money that people are hiding in their homes because they do not trust banks. When mattress savings in an economy are substantial, banks cannot lend out those funds and the money multiplier cannot operate as effectively. The overall quantity of money and loans in such an economy will decline.

Try It

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Watch it

This video explains how money is created and reviews the concepts you just learned about the money multiplier. It also explains a little bit about the Federal Reserve's involvement in creating new money to buy financial assets, thereby adding reserves to the banking system.

If banks hold the minimum amount of money required by the 10% reserve ratio, then they would lend out 90% of their reserves, and the multiplier would continue to stay around 10. This does not happen in practice, and the multiplier remains closer to 3. When we talk about monetary policy in more depth later, you'll learn more about other ways that the Federal Reserve may choose to increase the money supply.

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Try It

These questions allow you to get as much practice as you need, as you can click the link at the top of the first question ("Try another version of these questions") to get a new set of questions. Practice until you feel comfortable doing the questions.

[ohm_question]153725-153726-153741[/ohm_question]

Glossary

[glossary-page][glossary-term]money multiplier: [/glossary-term]
[glossary-definition]ratio of total money in the economy divided by the amount of reserves, or the ratio of change in the total money in the economy divided by a change in the amount of reserves; formula for the money multiplier is 1/(required reserve ratio)[/glossary-definition]
[glossary-term]required reserve ratio:[/glossary-term]
[glossary-definition]percentage of total deposits a bank must hold as reserves[/glossary-definition][/glossary-page]

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12.14: Putting It Together- Money and Banking



Figure 1. A debit card counts as money, but a credit card does not.

Money is not a specific item, but rather anything that has the functions of money, including its general acceptability as a means of payment, and its service as a store of value. Money is an asset, in contrast to credit, which while it serves as a means of payment is actually a liability. In other words, credit is a loan that must be repaid, usually with interest. Thus, a credit card is not money, but a debit card is.

The global economy has come a long way since it started using cowrie shells as currency. We have moved away from commodity and commodity-backed paper money to fiat currency. As technology and global integration increases, the need for paper currency is diminishing, too. Every day, we witness the increased use of debit and credit cards.

The latest creation and perhaps one of the purest forms of fiat money is the Bitcoin. Bitcoins are a digital currency that allows users to buy goods and services online. Customers can purchase products and services such as videos and books using Bitcoins. This currency is not backed by any commodity nor has any government decreed as legal tender, yet customers use it as a medium of exchange and can store its value (online at least). It is also unregulated by any central bank, but is created online through people solving very complicated mathematics problems and receiving payment afterward. Bitcoin.org is an information source if you are curious. Bitcoins are a relatively new type of money. At present, because it is not sanctioned as a legal currency by any country nor regulated by any central bank, it lends itself for use in illegal as well as legal trading activities. As technology increases and the need to reduce transactions costs associated with using traditional forms of money increases, Bitcoins or some sort of digital currency may replace our dollar bill, just as man replaced the cowrie shell.

Watch it

You can learn more about Bitcoin in the following video.

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In this module, we learned how the supply of money in the economy is largely determined by the amount of loans made in the banking system. In the next module, we will learn how the Federal Reserve, the central bank in the U.S., takes advantage of the loan-making process to control the money supply and credit conditions.

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12.15: Discussion- Money and Banking

Respond to the following prompt in a post with a minimum of 200 words, then comment on at least TWO other posts.

Consider the following items:

- Gold Coins
- Grocery Store Coupons
- Funds in a checking account
- Funds in a savings account
- 100 shares of Google stock
- Food Stamps

Which of these items is the best example of money? Which is the worst? How would you order the list from most money-like to least money-like? Explain your reasoning.

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12.16: Assignment- Baby Boomers

The Baby Boomers are a larger than average size demographic cohort in the United States. The Baby Boomers have begun to retire and will continue to do so in increasing numbers through about 2030. The retired have a very different saving rate than people in the middle years of their careers. Apply the theory of supply and demand to financial markets to predict the likely impact on interest rates of the Baby Boomers retiring. Show graphically and explain the economic reasoning.

Rubric

Criteria	Not Evident	Developing	Proficient	Distinguished	Weight
How does the saving rate of middle-career individuals compare with that of retirees?					4
How will the retirement of the Baby Boomers affect the average saving rate in the U.S. economy?					4
Analyze the effect of the Baby Boomers retirement on the supply and demand for financial capital: Show graphically the initial and final equilibrium.					4
Analyze the effect of the Baby Boomers retirement on the supply and demand for financial capital: Explain the economics behind the graph.					4
Write up your analysis using correct language, explaining all your work.					4
					Total: 20

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12.17: Assignment- Problem Set — Money and Banking

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CHAPTER OVERVIEW

13: Monetary Policy

13.1: Why It Matters- Monetary Policy
13.2: Introduction to the Federal Reserve
13.3: Banks, Loan Finance, and the Payments System
13.4: The Federal Reserve System and Central Banks
13.5: Bank Regulation
13.6: Introduction to Monetary Policy
13.7: Monetary Policy
13.8: Monetary Policy and Open Market Operations
13.9: Learn By Doing- Monetary Policy and Open Market Operations
13.10: Introduction to Monetary Policy and Economic Outcomes
13.11: Monetary Policy and Interest Rates
13.12: Monetary Policy and Aggregate Demand
13.13: Federal Reserve Actions and Quantitative Easing
13.14: Putting It Together- Monetary Policy
13.15: Discussion- Impact of Low Interest Rates on Monetary Policy
13.16: Assignment- Chair the Fed
13.17: Assignment- Problem Set — Monetary Policy

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13.1: Why It Matters- Monetary Policy



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We noted earlier that the government has two ways of influencing the economy. The first was fiscal policy by which the government raises or lowers the federal budget deficit.

The second, which we will introduce in this module, is monetary policy, which is how a special part of the government called a central bank regulates the availability of credit and regulates the banking system. The central bank of the United States is the Federal Reserve System (or Fed).

As this is written, interest rates have been unusually low for several years. Some are barely above zero. This is not so good for savers, but it is very good for borrowers.

- If you are interested in getting a loan to buy a car or getting a mortgage to buy a house, you probably wonder when interest rates will start rising back to “normal,” higher levels.
- If you are saving for retirement, low interest rates mean you may have to work more years to save up that nest egg, so you also want to know when interest rates will increase again.

After completing this module, you should have a good understanding of how to answer these questions.

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13.2: Introduction to the Federal Reserve

What you'll learn to do: explain the structure, functions, and responsibilities of the Federal Reserve System



In a modern, market economy, the availability of credit is critical to the functioning of the economy. Too little credit can hamstring an economy, while too much can cause inflation. The Federal Reserve (or Fed) plays a key role in the macro economy by regulating the supply of credit. In addition, it promotes stability in the financial system, and provides banking services to government and to commercial banks.

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13.3: Banks, Loan Finance, and the Payments System

Learning Objectives

- Explain the key role of banks in bringing lenders and borrowers together, and in facilitating the payments system
- Explain how the nature of banks makes them susceptible to bank runs

This module follows directly from the previous one on money and the banking system. Let's think again about the banking system and how it works. Banks are businesses, which accept deposits and make loans. The deposits come mostly from households, but every business also has one or more bank accounts. Businesses use bank accounts in the same way that individuals do—as a safe, liquid place to store savings. Individuals and businesses also use banks as a facility for making payments, through the use of demand deposits (or checks) or electronic payments (e.g. debit cards). A payment (whether check or debit) has to come from somewhere in the financial system, and banks are one way to fulfill that role.

Loan Finance

Banks earn income by making loans. They also make other safe investments, like purchases of Treasury securities, but primarily they are in the loan business. Businesses borrow from banks to finance investment expenditures and also for shorter term needs like payrolls. Households borrow from banks to finance home purchases (i.e. mortgages). Individuals borrow money to purchase cars and other vehicles. They also borrow money to pay for higher education. It is no overstatement to say that money and credit are the grease in a modern economic system, without which the economic system would operate at a much lower level.

In short, banks are one part of the larger financial system, which links savers and borrowers. Savers supply the funds for borrowing and borrowers provide the demand. A key element between lenders and borrowers is the **interest rate**, which is the price one pays to borrow money and the reward one receives for lending. We have seen earlier in this course that interest rates play a key role in promoting or inhibiting business investment and purchases of consumer durable goods (e.g. autos) and new homes.

Banks also play a key role in the payments system, by which individuals and businesses pay for their purchases. Think about how often you pay for your purchases using cash versus using checks, or electronic means (e.g. debit cards, credit cards or electronic transfers from your bank account). If you're like most Americans, fewer and fewer of your transactions are done with cash. Suppose you suddenly didn't have access to the funds in your bank accounts—there was no question that the money was there, you just couldn't get access to it for six months or a year. Imagine how that would affect your behavior and you can see how important the payments system is, as well as the vital role of banks.

Try It

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Because banks operate using a fractional reserve system, they are always vulnerable to liquidity constraints. Banks keep only a small fraction of deposits as reserves; the rest they put to work earning income as loans or other investments. This means that on any business day, banks will have less cash on hand than the potential withdrawals of their depositors. That is just the nature of the banking business.

Try It

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Bank Runs

Suppose a bank makes a bad loan, which the borrower is unable to repay. This has an adverse impact on the bank's balance sheet. When the bad loan is written off, the value of the bank's assets falls by the amount of the loan, and the bank's equity falls by the same amount. Handling loan losses is one reason why banks need sufficient equity. Depositors may worry about the safety of their deposits, if their bank is making bad loans. Suppose the bank makes a bigger bad loan, where the amount is larger than the bank's capital. When the bad loan is written off, the bank finds itself insolvent. **Insolvent** means the value of the bank's assets are less than the value of its liabilities. The bank is bankrupt. Depositors are now seriously worried since, by definition, the bank doesn't have the assets to pay off depositors in total. In this situation, whoever withdraws their deposits first receives all of their money, and

those who do not rush to the bank quickly enough, lose some or all of their money. We call depositors racing to the bank to withdraw their deposits a **bank run**.

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In fact, the bank run could have happened earlier, while the bank was still solvent, but losing equity. Either way, the bank is in a difficult situation. What can the bank do?



Figure 1. A Run on the Bank. Bank runs during the Great Depression only served to worsen the economic situation. (Credit: National Archives and Records Administration)

In the movie *It's a Wonderful Life*, the bank manager, played by Jimmy Stewart, faces a mob of worried bank depositors who want to withdraw their money, but manages to allay their fears by allowing some of them to withdraw a portion of their deposits—using the money from his own pocket that was supposed to pay for his honeymoon.

In the real world, the outcome of a bank run is likely different. If the bank is still solvent, it could attempt to raise cash by selling assets. But selling assets in a hurry risks fire-sale prices. What that means is that the sales bring in less money than the assets are worth. That could be enough to pay off enough depositors to stop the run. But it may not be since bank runs are based on emotion as much as logic. The bank could try to borrow in financial markets, but who is likely to lend to a bank in a financial crisis? If the run continues, the bank becomes bankrupt. If that were the end of the story, it would be bad enough. What if depositors of other banks become worried about the safety of their deposits? Bank runs can spread from failing banks to other banks, failing or solvent. This is called **financial contagion**.

Systemic bank runs cause interest rates to spike as lenders become very conservative about lending. If this persists over time, these higher interest rates have an adverse impact on investment and consumption expenditure as well as the economy as a whole. Bank runs also threaten the integrity of the payments system. Checks are built on trust. If a bank is suffering from a run, other banks are less likely to accept checks written on the failing bank, even if the check writer has sufficient funds in their account. This means that transactions don't go through and both parties to the transaction lose out. This provides an additional channel for the adverse impact of bank runs to spread. When I make a purchase from a vender, the vendor uses the revenues to pay bills. If the purchase doesn't go through because the check isn't accepted when the vendor deposits it into his bank, many people lose. This phenomenon happened widely during the Great Depression in the 1930s, when more than one third of commercial banks failed.

Try It

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Glossary

[glossary-page][glossary-term]financial contagion:[/glossary-term]
[glossary-definition]when fears that one bank is insolvent spread to fears that other banks are insolvent; can cause bank runs to occur at multiple banks[/glossary-definition][glossary-term]illiquidity:[/glossary-term]
[glossary-definition]when the demand for cash by depositors exceeds the bank's available reserves[/glossary-definition][glossary-term]insolvency:[/glossary-term]

[glossary-definition]when the value of a bank's assets is less than the value of its liabilities; i.e. bankrupt[/glossary-definition] [/glossary-page]

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13.4: The Federal Reserve System and Central Banks

Learning Objectives

- Explain the structure and organization of the U.S. Federal Reserve
- Discuss how central banks impact monetary policy, promote financial stability, and provide banking services

Structure and Organization of the Federal Reserve

In order to help financial systems operate smoothly and to reduce the likelihood of financial crises, most modern nations have a **central bank**. The oldest central bank is the Bank of England. Other prominent central banks include the Bank of Japan, and the European Central Bank, which is the central bank for the member countries of the European monetary system. In the United States, the central bank is called the Federal Reserve—often abbreviated as "the Fed." This section explains the organization of the U.S. Federal Reserve System and identifies the major responsibilities of a central bank.

The **Federal Reserve**, unlike most central banks, is semi-decentralized. At the national level, it is run by a Board of Governors, consisting of seven members appointed by the President of the United States and confirmed by the Senate. Appointments are for 14-year terms and they are arranged so that one term expires January 31 of every even-numbered year. The purpose of the long and staggered terms is to insulate the Board of Governors as much as possible from political pressure so that policy decisions can be made based only on their economic merits. Additionally, except when filling an unfinished term, each member only serves one term, further insulating decision-making from politics. Policy decisions of the Fed do not require congressional approval, and the President cannot ask for the resignation of a Federal Reserve Governor as the President can with cabinet positions.

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The Federal Reserve is more than the Board of Governors. The Fed also includes 12 regional Federal Reserve banks, each of which is responsible for supporting the commercial banks and economy generally in its district. The Federal Reserve districts and the cities where their regional headquarters are located are shown in Figure 2. The commercial banks in each district elect a Board of Directors for each regional Federal Reserve bank, and that board chooses a president for each regional Federal Reserve district. Thus, the Federal Reserve System includes both federally and private-sector appointed leaders.

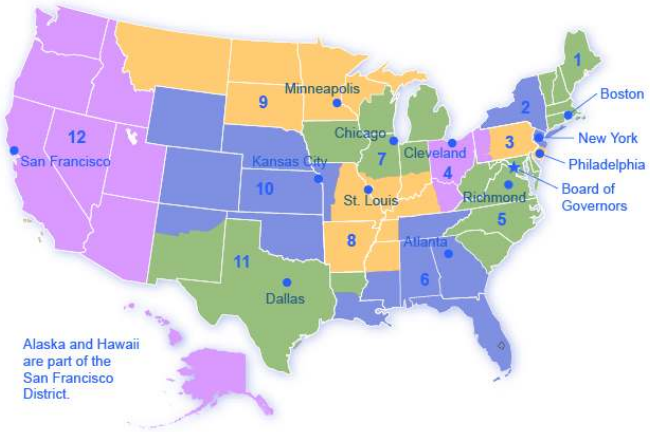


Figure 1. The Twelve Federal Reserve Districts. There are twelve regional Federal Reserve banks, each with its district.

One member of the Fed's Board of Governors is designated as the Chair. For example, from 1987 until early 2006, the Chair was Alan Greenspan. From 2006 until 2014, Ben Bernanke held the post. The next Chair, Janet Yellen, held the position from 2014 to 2018, and now Jerome Powell heads the organization.

WHO HAS THE MOST IMMEDIATE ECONOMIC POWER IN THE WORLD?



Figure 2. Janet L. Yellen was the first woman to hold the

position of Chair of the Federal Reserve Board of Governors. (Credit: Board of Governors of the Federal Reserve System)

What individual can make financial market crash or soar just by making a public statement? It is not Bill Gates or Warren Buffett. It is not even the President of the United States.



Figure 3. Chair of the Federal Reserve Board, Jerome Powell.

The answer is the Chair of the Federal Reserve Board of Governors. In early 2014, Janet L. Yellen, shown in Figure 1, became the first woman to hold this post. Yellen has been described in the media as "perhaps the most qualified Fed chair in history." With a Ph.D. in economics from Yale University, Yellen taught macroeconomics at Harvard, the London School of Economics, and at the University of California at Berkeley before becoming the President of the Federal Reserve Bank of San Francisco between 2004–2010.

In February 2018, Yellen was succeeded as Fed Chair by Jerome Powell, a lawyer and investment banker.

The Fed Chair is first among equals on the Board of Governors. While he or she has only one vote, the Chair controls the agenda, and is the public voice of the Fed, so he or she has more power and influence than one might expect.

Visit the Federal Reserve Board website to learn more about the current members of the Federal Reserve Board of Governors. You can follow the links provided for each board member to learn more about their backgrounds, experiences, and when their terms on the board will end.

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What Does a Central Bank Do?

The Federal Reserve, like most central banks, is designed to perform three important functions:

1. To provide banking services to commercial banks and other depository institutions, and to provide banking services to the federal government.
2. To promote stability of the financial system
3. To conduct monetary policy

We will discuss the first function here. The other two functions are sufficiently important that we will explain them on their own pages.

The Federal Reserve is sometimes called a "banker's bank." The reason for this is that the Fed provides many of the same services to banks as banks provide to their customers. For example, all commercial banks have an account at the Fed where they deposit reserves. In fact, most of a commercial bank's reserves are not held on the premises; rather, they are held at their regional Federal Reserve bank. Banks can also obtain loans from the Fed through the "discount window" facility, which will be discussed in more detail later. Additionally, the Fed is responsible for check processing. When you write a check, for example, to buy groceries, the grocery store deposits the check in its bank account. Then, the physical check (or an image of that actual check) is returned to your bank, after which funds are transferred from your bank account to the account of the grocery store. The Fed is responsible for each of these actions.

On a more mundane level, the Federal Reserve ensures that enough currency and coins are circulating through the financial system to meet public demands. For example, each year the Fed increases the amount of currency available in banks around the Christmas shopping season and reduces it again in January.

Finally, the Fed is responsible for assuring that banks are in compliance with a wide variety of consumer protection laws. For example, banks are forbidden from discriminating on the basis of age, race, sex, or marital status. Banks are also required to disclose publicly information about the loans they make for buying houses and how those loans are distributed geographically, as well as by sex and race of the loan applicants.

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Watch It

Watch Mr. Clifford at the Federal Reserve building in Washington D.C. as he gives an overview of the Federal Reserve System and how it works.

An interactive or media element has been excluded from this version of the text. You can view it online here: http://pb.libretexts.org/mlum/?p=553

Glossary

[glossary-page][glossary-term]central bank:[/glossary-term]
[glossary-definition]institution which conducts a nation's monetary policy and regulates its banking system[/glossary-definition][glossary-term]Federal Reserve: [/glossary-term]
[glossary-definition]the central bank of the United States run by a 7-member Board of Governors in conjunction with 12 regional Federal Reserve banks[/glossary-definition] [/glossary-page]

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13.5: Bank Regulation

Learning Objectives

- Explain bank supervision and measures taken to reduce the risk of bank insolvency (including reserve requirements, bank capital requirements, and restrictions on investments)
- Explain how deposit insurance and lender of last resort are two strategies to protect against bank runs

A safe and stable national financial system is a critical concern of the Federal Reserve. The goal is not only to protect individuals' savings, but to protect the integrity of the financial system itself. This esoteric task is usually behind the scenes, but came into view during the 2008–2009 financial crisis, when for a brief period of time, critical parts of the financial system failed and firms became unable to obtain financing for ordinary parts of their business. Imagine if suddenly you were unable to access the money in your bank accounts because your checks were not accepted for payment and your debit cards were declined. This gives an idea of a failure of the payments/financial system.

Bank regulation is intended to maintain banks' solvency by avoiding excessive risk. Regulation falls into a number of categories, including reserve requirements, **capital requirements**, and restrictions on the types of investments banks may make. In the previous module on money and the banking system, we learned that banks are required to hold a minimum percentage of their deposits on hand as reserves, to cover desired withdrawals by depositors. "On hand" is a bit of a misnomer because, while a portion of bank reserves are held as cash in the bank, the majority are held in the bank's account at the Federal Reserve.

Bank capital is the difference between the value of a bank's assets and the value of its liabilities. In other words, it is a bank's net worth. A bank must have positive net worth; otherwise it is insolvent or bankrupt, meaning it would not have enough assets to pay back its liabilities. Regulation requires that banks maintain a minimum net worth, usually expressed as a percent of their assets, to protect their depositors and other creditors.

Another part of bank regulation is restrictions on the types of investments banks are allowed to make. Banks are permitted to make loans to businesses, individuals, and other banks. They can purchase U.S. Treasury securities but, to protect depositors, they are not permitted to invest in the stock market or other assets that are perceived as too risky.

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Bank Supervision

Several government agencies monitor banks' balance sheets to make sure they have positive net worth and are not taking too high a level of risk. Within the U.S. Department of the Treasury, the Office of the Comptroller of the Currency has a national staff of bank examiners who conduct on-site reviews of the 1,500 or so of the largest national banks. The bank examiners also review any foreign banks that have branches in the United States. The Office of the Comptroller of the Currency also monitors and regulates about 800 savings and loan institutions.

The National Credit Union Administration (NCUA) supervises credit unions, which are nonprofit banks that their members run and own. There are over 6,000 credit unions in the U.S. economy, although the typical credit union is small compared to most banks.

The Federal Reserve also has some responsibility for supervising financial institutions. For example, conglomerate firms that own banks and other businesses are called bank holding companies. While other regulators like the Office of the Comptroller of the Currency supervises the banks, the Federal Reserve supervises the holding companies.

When bank supervision (and supervision of bank-like institutions such as savings and loans and credit unions) works well, most banks will remain financially healthy most of the time. If the bank supervisors find that a bank has low or negative net worth, or is making too high a proportion of risky loans, they can require that the bank change its behavior—or, in extreme cases, even force the bank to close or be sold to a financially healthy bank.

Bank supervision can run into both practical and political questions. The practical question is that measuring the value of a bank's assets is not always straightforward. A bank's principal assets are its loans, and the value of these assets depends on the risk that customers will not repay these loans on time, or at all. These issues can become even more complex when a bank makes loans to banks or firms in other countries, or arranges financial deals that are much more complex than a basic loan.

The political question arises because a bank supervisor's decision to require a bank to close or to change its financial investments is often controversial, and the bank supervisor often comes under political pressure from the bank's owners and the local politicians to keep quiet and back off.

For example, many observers have pointed out that Japan's banks were in deep financial trouble through most of the 1990s; however, nothing substantial had been done about it by the early 2000s. A similar unwillingness to confront problems with struggling banks is visible across the rest of the world, in East Asia, Latin America, Eastern Europe, Russia, and elsewhere.

In the United States, the government passed laws in the 1990s requiring that bank supervisors make their findings open and public, and that they act as soon as they identify a problem. However, as many U.S. banks were staggered by the 2008-2009 recession, critics of the bank regulators asked pointed questions about why the regulators had not foreseen the banks' financial shakiness earlier, before such large losses had a chance to accumulate.

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Deposit Insurance

The risk of bank runs creates instability in the banking system. Even a rumor that a bank might experience negative net worth could trigger a bank run and, in a bank run, even healthy banks could be destroyed. Moreover, a run at one bank often triggered financial contagion that threatens the integrity of the payment system across the economy.

To protect against bank runs, Congress has put two strategies into place: deposit insurance and the lender of last resort. **Deposit insurance** is an insurance system that makes sure depositors in a bank do not lose their money, even if the bank goes bankrupt. About 70 countries around the world, including all of the major economies, have deposit insurance programs. In the United States, the Federal Deposit Insurance Corporation (FDIC) is responsible for deposit insurance. Banks pay an insurance premium to the FDIC. The insurance premium is based on the bank's level of deposits, and then adjusted according to the riskiness of a bank's financial situation. In 2009, for example, a fairly safe bank with a high net worth might have paid 10–20 cents in insurance premiums for every $100 in bank deposits, while a risky bank with very low net worth might have paid 50–60 cents for every $100 in bank deposits.

Bank examiners from the FDIC evaluate the banks' balance sheets, looking at the asset and liability values to determine the risk level. The FDIC provides deposit insurance for about 5,898 banks (as of the end of February 2017). Even if a bank fails, the government guarantees that depositors will receive up to $250,000 of their money in each account, which is enough for almost all individuals, although not sufficient for many businesses. Since the United States enacted deposit insurance in the 1930s, no one has lost any of their federally insured deposits. Bank runs no longer happen at insured banks.

Private deposit insurance programs have been shown to be unable to handle systemic bank runs when too many banks fail. Only the Federal government has the resources to cover large amounts of deposit losses.

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Lender of Last Resort

The problem with bank runs is not that insolvent banks will fail; they are, after all, bankrupt and need to be shut down. The problem is that bank runs can cause solvent banks to fail and spread to the rest of the financial system. To prevent this, the Fed stands ready to lend to banks and other financial institutions when they cannot obtain funds from anywhere else. This is known as the **lender of last resort** role. For banks, the central bank acting as a lender of last resort helps to reinforce the effect of deposit insurance and to reassure bank customers that they will not lose their money.

The lender of last resort task can arise in other financial crises, as well. During the 1987 stock market crash panic, when U.S. stock values fell by 25% in a single day, the Federal Reserve made a number of short-term emergency loans so that the financial system could keep functioning. During the 2008-2009 recession, we can interpret the Fed's "quantitative easing" policies (explained in more detail later) as a willingness to make short-term credit available as needed in a time when the banking and financial system was under stress.

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Watch It

Watch this video to better understand how and why the Fed serves as a lender of last resort. The video also explains why the government bailed banks out of the 2008 financial crisis.

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glossary

[glossary-page][glossary-term]bank capital requirements minimum percentage (of assets):[/glossary-term]
[glossary-definition] a bank's capital must exceed to stay in operation[/glossary-definition][glossary-term]bank run:[/glossary-term]
[glossary-definition]when depositors fear their bank is insolvent, they will "run" to withdrawn their deposits; because of fractional reserve banking, bank runs can turn solvent banks insolvent[/glossary-definition][glossary-term]deposit insurance:[/glossary-term]
[glossary-definition]program which insures commercial bank depositors up to $250,000 per bank in the U.S.[/glossary-definition]
[glossary-term]lender of last resort:[/glossary-term]
[glossary-definition]role of the Fed to provide loans to distressed banks when the banks can't obtain credit from anywhere else[/glossary-definition][/glossary-page]

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13.6: Introduction to Monetary Policy

What you'll learn to do: describe monetary policy and the Fed's three main policy tools



In the last two sections, we have discussed how the Federal Reserve provides banking services to banks and the federal government, and how the Fed regulates the banking system. In this section, we will begin to discuss what is perhaps the Fed's most important responsibility: conducting monetary policy.

Along with fiscal policy, monetary policy is one of the two major tools governments can use to influence the course of the economy. While it is easy to confuse the two, monetary policy is very different than fiscal policy. While the goals of the two policies may be similar, in this section you will see that the mechanisms for achieving those goals are very different.

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13.7: Monetary Policy

Learning Objectives

- Describe monetary policy and the Fed's three main policy tools
- Explain and demonstrate how the central bank executes monetary policy by changing the discount rate
- Explain and demonstrate how the central bank executes monetary policy through changing reserve requirements

The most important function of the Federal Reserve is to conduct monetary policy. Article I, Section 8 of the U.S. Constitution gives Congress the power "to coin money" and "to regulate the value thereof." As part of the 1913 legislation that created the Federal Reserve, Congress delegated these powers to the Fed.

We learned earlier that credit is the grease in an economic system. Central banks use **monetary policy** to manage interest rates and thus the availability of credit. Changes in credit conditions influence the levels of economic activity (i.e. real GDP, employment and prices).

Watch It

First, watch this video for an overview of monetary policy and to understand how the Fed utilizes open market operations, the required reserve ratio, and the discount rate to impact the economy. Afterwards, we will examine these tools in more detail.

An interactive or media element has been excluded from this version of the text. You can view it online here: http://pb.libretexts.org/mlum/?p=559

How a Central Bank Executes Monetary Policy

Monetary policy operates through a complex mechanism, but the basic idea is simple. The Fed supplies (or withdraws) reserves to the banking system, which affects the availability of credit generally. (It might be helpful to refer back to "How Banks Create Money" or this video about the money multiplier in the previous module for a review.)

A central bank has three traditional tools to implement monetary policy in the economy:

- **Changing the discount rate**, which is the interest rate charged by the central bank on the loans that it gives to other commercial banks
- **Changing reserve requirements**, which determine what level of reserves a bank is legally required to hold
- **Open market operations**, which involves buying and selling government bonds with banks

First, recall the way banks work. They accept deposits from individuals and businesses, a portion of which they hold as reserves. The remaining deposits are lent out, either as loans or to the government by purchasing Treasury securities.

Every business day, banks receive new deposits and existing depositors make withdrawals. This means that the bank's reserves go up and down. Some days a bank ends up with more reserves than required by the Fed. These are called excess reserves. Other days the bank ends up with fewer reserves than required. This is a problem that needs to be addressed quickly.

One option is to enter the federal funds market. The federal funds market is not affiliated with the federal government. Rather, it is a private market where commercial banks go to lend excess reserves for a 24 hour period to other commercial banks with a reserve shortfall. The **federal funds rate** is the interest rate on these overnight, interbank loans. The federal funds rate is possibly the best indicator of credit conditions on short term loans, and changes in credit conditions are quickly reflected by changes in the federal funds rate. We will see the importance of this later.

Changing the Discount Rate

The Federal Reserve was founded in the aftermath of the Financial Panic of 1907 when many banks failed as a result of bank runs. As mentioned earlier, since banks make profits by lending out their deposits, no bank, even those that are not bankrupt, can withstand a sufficiently long bank run. As a result of the Panic, the Federal Reserve was founded to be a "lender of last resort." In the event of a bank run, sound banks (banks that were not bankrupt) could borrow as much cash as they needed from the Fed's discount "window" to quell the bank run. The interest rate banks pay for such loans is called the **discount rate**. (They are so named because loans are made against the bank's outstanding loans "at a discount" of their face value.) Once depositors became convinced

that the bank would be able to honor their withdrawals, they no longer had a reason to make a run on the bank. In short, the Federal Reserve was originally intended to provide credit passively, but in the years since its founding, the Fed has taken on a more active role with monetary policy.

Borrowing from the Fed is an alternative to borrowing in the federal funds market for commercial banks that find themselves short of required reserves. This option created the opportunity for the Fed to more actively conduct monetary policy by raising or lowering the discount rate. If the central bank raises the discount rate, then commercial banks will reduce their borrowing of reserves from the Fed, and instead borrow from the federal funds market, or for more serious needs, call in loans to replace those reserves. The net effects of raising the discount rate will be a decrease in the amount of reserves in the banking system. Fewer reserves will support fewer loans; the money supply will fall and market interest rates will rise. If the central bank lowers the discount rate it charges to banks, the process works in reverse.

In the Federal Reserve Act, the phrase "…to afford means of rediscounting commercial paper" is contained in its long title. Changing the discount rate was seen as the main tool for monetary policy when the Fed was initially created.

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In recent decades, the Federal Reserve has made relatively few discount loans. Before a bank borrows from the Federal Reserve to fill out its required reserves, the bank is expected to first borrow from other available sources, like other banks. This is encouraged by Fed's charging a higher discount rate than the federal funds rate. Given that most banks borrow little at the discount rate, changing the discount rate up or down has little impact on their behavior. More importantly, the Fed has found from experience that open market operations are a more precise and powerful means of executing any desired monetary policy. This is a good example of how monetary policy has evolved and how it continues to do so.

Try It

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Watch It

Watch the selected clip from this video to see how the Fed can use the discount rate to impact interest rates.

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Changing Reserve Requirements

A second method of conducting monetary policy is for the central bank to raise or lower the **reserve requirement**, which, as we noted earlier, is the percentage of each bank's deposits that it is legally required to hold either as cash in their vault or on deposit with the Fed. If the Fed were to raise the reserve requirement, banks would have to hold a greater amount in reserves; thus, they have less money available to lend out, and credit would be harder to obtain economy-wide. If the Fed were to lower the reserve requirement, banks would be allowed to hold a smaller amount in reserves, and they will have a greater amount of money available to lend out, increasing the availability of credit.

Try It

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At the end of 2013, the Federal Reserve required banks to hold reserves equal to 0% of the first $13.3 million in deposits, then to hold reserves equal to 3% of the deposits up to $89.0 million in checking and savings accounts, and 10% of any amount above $89.0 million. Small changes in the reserve requirements are made almost every year. For example, the $89.0 million dividing line is sometimes bumped up or down by a few million dollars. In practice, large changes in reserve requirements are rarely used to execute monetary policy. A sudden demand that all banks increase their reserves would be extremely disruptive and difficult to

comply with, while loosening requirements too much would create a danger of banks being unable to meet the demand for withdrawals.

Try It

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Glossary

[glossary-page]
[glossary-term]discount rate: [/glossary-term]
[glossary-definition]the interest rate charged by the central bank on the loans that it gives to other commercial banks[/glossary-definition]
[glossary-term]federal funds rate: [/glossary-term]
[glossary-definition]the interest rate on overnight, interbank loans.[/glossary-definition][glossary-term]open market operations: [/glossary-term][glossary-definition]the central bank selling or buying Treasury bonds to influence the quantity of money and the level of interest rates[/glossary-definition]
[glossary-term]reserve requirement:[/glossary-term][glossary-definition]the percentage amount of its total deposits that a bank is legally obligated to to either hold as cash in their vault or deposit with the central bank[/glossary-definition][/glossary-page]

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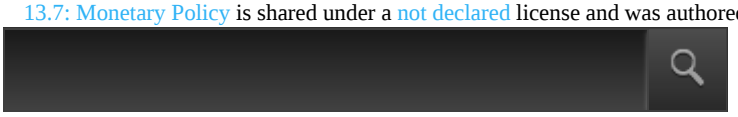
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13.8: Monetary Policy and Open Market Operations

Learning Outcomes

- Explain and demonstrate how the central bank executes monetary policy through open market operations

Open Market Operations

The most commonly used tool of monetary policy in the U.S. is **open market operations**. Open market operations take place when the central bank sells or buys U.S. Treasury securities in order to influence the quantity of bank reserves and the level of interest rates. When the Fed conducts open market operations, it targets the federal funds rate, since that interest rate reflects credit conditions in financial markets very well.

Decisions regarding open market operations are made by the **Federal Open Market Committee (FOMC)**. The FOMC is made up of the seven members of the Federal Reserve's Board of Governors, plus five voting members who are drawn, on a rotating basis, from the regional Federal Reserve Banks. The New York district president is a permanent voting member of the FOMC and the other four spots are filled on a rotating, annual basis from the other 11 Federal Reserve districts. The FOMC typically meets every six weeks, but it can meet more frequently if necessary. The FOMC tries to act by consensus; however, the chairman of the Federal Reserve has traditionally played a very powerful role in defining and shaping that consensus. For the Federal Reserve, and for most central banks, open market operations have, over the last few decades, been the most commonly used tool of monetary policy.

LINK IT UP

Visit this website for the Federal Reserve to learn more about current monetary policy.

In the module on Money & Banking, we introduced the loan expansion process by which commercial banks lend out excess reserves. The loans are in the form of new checking account balances, which become part of the money supply. We used the money multiplier defined as 1/Required Reserve Ratio to develop a formula for determining how much the money supply increases through the loan expansion process. When the Federal Reserve conducts open market operations to increase the money supply by purchasing Treasury bonds, since the Fed pays with money coming from outside the banking system, the money supply increases more than if someone deposited cash (which was already counted as part of the M1 money supply).

To understand how open market operations affect the money supply, consider the balance sheet of Happy Bank, displayed in Figure 1. Figure 1(a) shows that Happy Bank starts with $460 million in assets, divided among reserves, bonds and loans, and $400 million in liabilities in the form of deposits, with a net worth of $60 million. When the central bank purchases $20 million in bonds from Happy Bank, the bond holdings of Happy Bank fall by $20 million and the bank's reserves rise by $20 million, as shown in Figure 1(b). However, Happy Bank only wants to hold $40 million in reserves (the quantity of reserves that it started with in Figure 1(a), so the bank decides to loan out the extra $20 million in reserves and its loans rise by $20 million, as shown in Figure 1(c). The open market operation by the central bank causes Happy Bank to make loans instead of holding its assets in the form of government bonds, which expands the money supply. As the new loans are deposited in banks throughout the economy, these banks will, in turn, loan out some of the deposits they receive, triggering the money multiplier and increasing the supply of money.

Assets		Liabilities + Net Worth	
Reserves	40	Deposits	400
Bonds	120		
Loans	300	Net Worth	60

(a) The original balance sheet

Assets		Liabilities + Net Worth	
Reserves	40 + 20 = 60	Deposits	400
Bonds	120 – 20 = 100		
Loans	300	Net Worth	60

(b) The central bank buys bonds

Assets		Liabilities + Net Worth	
Reserves	60 – 20 = 40	Deposits	400
Bonds	100		
Loans	300 + 20 = 320	Net Worth	60

(c) The bank makes additional loans

Figure 1. Balance Sheets for Happy Bank. Figure 1(a) shows that Happy Bank starts with $460 million in assets. In (b), the Federal Reserve purchases $20 million in bonds from Happy Bank, which lowers Happy Bank's bonds holdings, but increases their bank reserves by $20 million. In (c), Happy Bank decides to loan out that $20 million, thereby increasing their loans.

Try It

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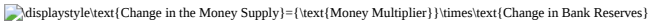
Where did the Federal Reserve get the $20 million that it used to purchase the bonds? A central bank has the power to create money. In practical terms, the Federal Reserve would write a check to Happy Bank, so that Happy Bank can have that money credited to its bank account at the Federal Reserve. In truth, the Federal Reserve created the money to purchase the bonds out of thin air—or with a few clicks on some computer keys.

Using the Money multiplier Formula

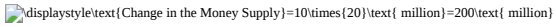
How much did the Fed's $20 million open market purchase of bonds increase the money supply? We can use the following formula to find out, recalling that since the reserve requirement is 10%, the money multiplier is 10:



Or in other words,



so,



One final note: In the example above, the Fed purchased bonds from Happy Bank, but that is not necessary for monetary policy to play out. The Fed purchases bonds from whoever owns them. It could be a bank, or a corporation or a person. As long as the bond seller deposits the Fed's payment in a bank, the process plays out as described.

Open market operations can also reduce the quantity of money and loans in an economy. Figure 2(a) shows the balance sheet of Happy Bank before the central bank sells bonds in the open market. When Happy Bank purchases $30 million in bonds, Happy Bank sends $30 million of its reserves to the central bank, but now holds an additional $30 million in bonds, as shown in Figure 2(b). However, Happy Bank wants to hold $40 million in reserves, as in Figure 2(a), so it will adjust down the quantity of its loans by $30 million, to bring its reserves back to the desired level, as shown in Figure 2(c). In practical terms, a bank can easily reduce its quantity of loans. At any given time, a bank is receiving payments on loans that it made previously and also making new loans. If the bank just slows down or briefly halts making new loans, and instead adds those funds to its reserves, then its overall quantity of loans will decrease. A decrease in the quantity of loans also means fewer deposits in other banks, and other banks reducing their lending as well, as the money multiplier takes effect. And what about all those bonds? How do they affect the money supply? Read on to find out.

Assets		Liabilities + Net Worth	
Reserves	40	Deposits	400
Bonds	120		
Loans	300	Net Worth	60

(a) The original balance sheet

Assets		Liabilities + Net Worth	
Reserves	40 - 30 = 10	Deposits	400
Bonds	120 + 30 = 150		
Loans	300	Net Worth	60

(b) The central bank sells bonds to the bank

Assets		Liabilities + Net Worth	
Reserves	10 + 30 = 40	Deposits	400
Bonds	150		
Loans	300 – 30 = 270	Net Worth	60

(c) The bank makes fewer loans

Figure 2. Balance Sheets for Happy Bank. When Happy Bank purchases $30 million in bonds, Happy Bank sends $30 million of its reserves to the central bank, but now holds an additional $30 million in bonds, as shown in (b). For Happy Bank to maintain its level of reserves at $40 million, it needs to reduce its quantity of loans, as shown in (c).

Try It

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DOES SELLING OR BUYING BONDS INCREASE THE MONEY SUPPLY?

Is it a sale of bonds by the central bank which increases bank reserves and lowers interest rates or is it a purchase of bonds by the central bank? The easy way to keep track of this is to treat the central bank as being *outside* the banking system. When a central bank buys bonds, money is flowing from the central bank to individual banks in the economy, increasing the supply of money in circulation. When a central bank sells bonds, then money from individual banks in the economy is flowing into the central bank—reducing the quantity of money in the economy.

Watch it

Watch this video to review how the FED uses open market operations to influence interest rates.

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Glossary

[glossary-page][glossary-term]open market operations:[/glossary-term][glossary-definition]the central bank selling or buying Treasury securities to influence the quantity of money and the level of interest rates[/glossary-definition][glossary-term]open market purchase: [/glossary-term][glossary-definition]the central bank buys Treasure securities to increase bank reserves and lower interest rates[/glossary-definition][glossary-term]open market sale: [/glossary-term][glossary-definition]the central bank sells Treasure securities to decrease bank reserves and raise interest rates[/glossary-definition][/glossary-page]

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13.9: Learn By Doing- Monetary Policy and Open Market Operations

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13.10: Introduction to Monetary Policy and Economic Outcomes

What you'll learn to do: explain how monetary policy affects GDP and the interest rates



Expansionary and contractionary monetary policies affect the broader economy, by influencing interest rates, aggregate demand, real GDP and the price level. In this section, we will take a look at the mechanisms by which monetary policy plays out. We will also review some of the Federal Reserve's policies over the last four decades and the impact its decisions had on the economy.

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13.11: Monetary Policy and Interest Rates

Learning Objectives

- Contrast expansionary monetary policy and contractionary monetary policy
- Explain how monetary policy impacts interest rates
- Explain how monetary policy tools (changes to the reserve requirement, discount rate, or open market operations) affect the money market

Expansionary and Contractionary Policies

Monetary policy affects aggregate demand and the level of economic activity by increasing or decreasing the availability of credit, which can be seen through decreasing or increasing interest rates. Recall that an open market purchase by the Fed adds reserves to the banking system. Banks turn those reserves into new loans, making credit available to more borrowers and increasing the supply of money.

Consider the market for loanable bank funds, shown in Figure 1. The original equilibrium (E_0) occurs at an interest rate of 8% and a quantity of funds loaned and borrowed of $10 billion. An open market purchase by the Fed will shift the supply of loanable funds to the right from the original supply curve (S_0) to S_1, leading to an equilibrium (E_1) with a lower interest rate of 6% and a quantity of funds loaned of $14 billion. This is an example of an **expansionary monetary policy**.

Conversely, an open market sale by the Fed reduces the amount of reserves in the banking system which requires banks to decrease their loans outstanding, reducing the availability of credit and decreasing the supply of money. This will shift the supply of loanable funds to the left from the original supply curve (S_0) to S_2, leading to an equilibrium (E_2) with a higher interest rate of 10% and a quantity of funds loaned of $8 billion. This is an example of **contractionary monetary policy.**

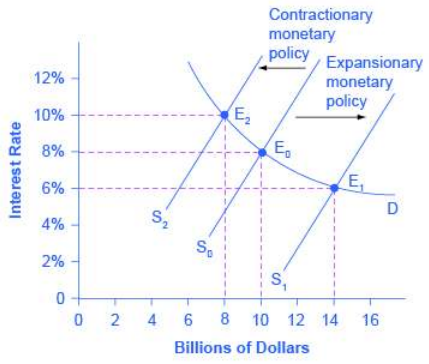


Figure 1. **Monetary Policy and Interest Rates.** The original equilibrium occurs at E_0. An expansionary monetary policy will shift the supply of loanable funds to the right from the original supply curve (S_0) to the new supply curve (S_1) and to a new equilibrium of E_1, reducing the interest rate from 8% to 6%. A contractionary monetary policy will shift the supply of loanable funds to the left from the original supply curve (S_0) to the new supply (S_2), and raise the interest rate from 8% to 10%.

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The Effect of Monetary Policy on Interest Rates

So how does a central bank “raise” interest rates? When describing the monetary policy actions taken by a central bank, it is common to hear that the central bank “raised interest rates” or “lowered interest rates.” We need to be clear about this: more precisely, through open market operations the central bank changes bank reserves in a way which affects the supply curve of loanable funds.

When the Fed decides to conduct an expansionary monetary policy, they purchase Treasury securities held by private investors. When the private investors deposit their payment from the Fed, the new reserves have been injected into the banking system. As a result, interest rates change, as shown in Figure 1. If they do not meet the Fed's target, the Fed can buy or sell Treasury securities, injecting more or less reserves into the banking system until interest rates do.

Recall that the specific interest rate the Fed targets is the **federal funds rate**. The Federal Reserve has, since 1995, established its target federal funds rate in advance of any open market operations.

Of course, financial markets display a wide range of **interest rates,** representing borrowers with different risk premiums and loans that are to be repaid over different periods of time. The **prime rate** is the interest rate banks charge their very best corporate customers, borrowers with the strongest credit ratings. If Google were to borrow money from Bank of America for a short period of time, Google would be charged Bank of America's Prime Rate. Customers with less strong credit ratings would be charged more than the prime rate (typically thought of as Prime rate plus a premium). The prime rate is thus the floor on which a bank's short term rates of different types are based. Additionally, variable interest rates like car loans or credit cards are often based on the prime rate. When the prime rate changes, variable interest rates will change also. Since each bank can charge its own prime rate, the published prime rate is the consensus or average rate banks charge. Longer term interest rates like mortgage rates typically are higher than shorter term rates like the federal funds rate to reflect the fact that lenders have given up the use of their funds for longer periods of time.

Both the federal funds rate and the prime rate are market determined interest rates. In other words, they are determined through the interaction between supply and demand in their respective credit markets.

In general, when the federal funds rate drops substantially, other interest rates drop, too, and when the federal funds rate rises, other interest rates rise. However, a fall or rise of one percentage point in the federal funds rate—which remember is for borrowing overnight—will typically have an effect of less than one percentage point on a 30-year loan to purchase a house or a three-year loan to purchase a car. Monetary policy can push the entire spectrum of interest rates higher or lower, but the specific interest rates are set by the forces of supply and demand in those specific markets for lending and borrowing.

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Monetary Policy–An Alternative Approach

In finance, people differentiate between money markets and capital markets. **Capital markets** refer to the markets for long term financial assets: e.g. notes, bonds, and equities. **Money markets** refer to the market for short term financial assets, like bank accounts, small denomination time deposits (e.g. Certificates of Deposit) and bills.

Thus far, we have explained how monetary policy is implemented and used the market for loanable funds to illustrate this idea. The **market for loanable funds** is a broad view of financial markets, including equities, bonds, bank accounts and all other financial assets, something like money markets and capital markets combined. We can also analyze monetary policy by looking only at the money market, which we'll do in the following video. The money market is a subset of financial markets generally, but it is useful to examine how monetary policy plays out in the money market because that is where monetary policy is focused; it's only after monetary policy impacts money markets that it spills over more broadly into other financial markets. As you watch the video, think about how this is similar to and different from the loanable funds market analysis we presented above. The main difference is that the money supply curve is vertical since the Fed can fix the supply of bank reserves and thus set the money supply at any level it wishes, independent of the interest rate. The outcomes of the money market analysis and the market for loanable funds are the same —this is just an equivalent way to think about monetary policy.

Watch It

Watch this video to better understand how the Fed can alter interest rates. You'll see how adjustments to either the reserve requirement, discount rate, or open market operations can lead to either expansionary or contractionary fiscal policy.

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13.12: Monetary Policy and Aggregate Demand

Learning Objectives

- Explain and show how monetary policy impacts aggregate demand

Monetary Policy and Aggregate Demand

Monetary policy affects interest rates and the available quantity of loanable funds, which in turn affects several components of aggregate demand. Tight or contractionary monetary policy that leads to higher interest rates and a reduced quantity of loanable funds will reduce two components of aggregate demand. Business investment will decline because it is less attractive for firms to borrow money, and even firms that have money will notice that, with higher interest rates, it is relatively more attractive to put those funds in a financial investment than to make an investment in physical capital. In addition, higher interest rates will discourage consumer borrowing for big-ticket items like houses and cars. Conversely, loose or expansionary monetary policy that leads to lower interest rates and a higher quantity of loanable funds will tend to increase business investment and consumer borrowing for big-ticket items.

Watch It

Watch this video for a clear example of how changes in interest rates can impact investment, which in turn affect consumption, which can shift aggregate demand.

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Try It

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If the economy is suffering a recession and high unemployment, with output below potential GDP, expansionary monetary policy can help the economy return to potential GDP. Figure 1(a) illustrates this situation. This example uses a short-run upward-sloping Keynesian aggregate supply curve (AS). The original equilibrium during a recession of Er occurs at an output level of 600. An expansionary monetary policy will reduce interest rates and stimulate investment and consumption spending, causing the original aggregate demand curve (AD_0) to shift right to AD_1, so that the new equilibrium (Ep) occurs at the potential GDP level of 700.

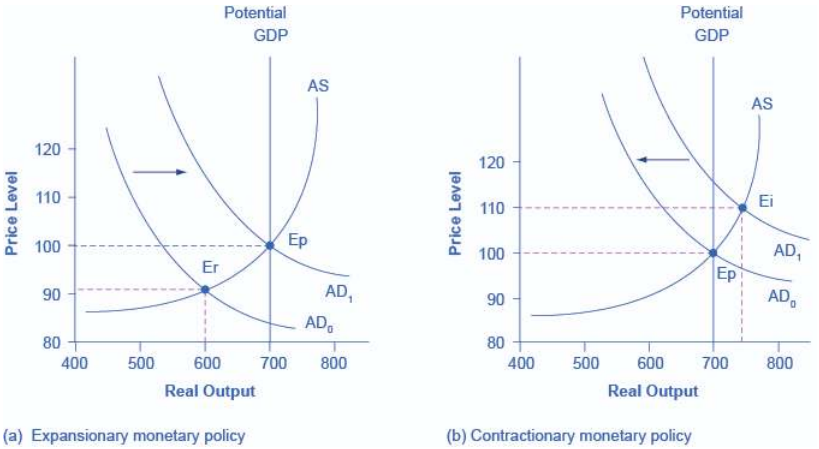


Figure 1. Expansionary or Contractionary Monetary Policy. (a) The economy is originally in a recession with the equilibrium output and price level shown at Er. Expansionary monetary policy will reduce interest rates and shift aggregate demand to the right from AD_0 to AD_1, leading to the new equilibrium (Ep) at the potential GDP level of output with a relatively small rise in the price level. (b) The economy is originally producing above the potential GDP level of output at the equilibrium Ei and is experiencing pressures for an inflationary rise in the price level. Contractionary monetary policy will shift aggregate demand to the left from AD_0 to AD_1, thus leading to a new equilibrium (Ep) at the potential GDP level of output.

Conversely, if an economy is producing at a quantity of output above its potential GDP, a contractionary monetary policy can reduce the inflationary pressures for a rising price level. In Figure 1(b), the original equilibrium (Ei) occurs at an output of 750, which is above potential GDP. A contractionary monetary policy will raise interest rates, discourage borrowing for investment and consumption spending, and cause the original demand curve (AD_0) to shift left to AD_1, so that the new equilibrium (Ep) occurs at the potential GDP level of 700.

These examples suggest that monetary policy should be **countercyclical** that is, it should act to counterbalance the business cycles of economic downturns and upswings. Monetary policy should be loosened when a recession has caused unemployment to increase and tightened when inflation threatens. Of course, countercyclical policy does pose a danger of overreaction. If loose monetary policy seeking to end a recession goes too far, it may push aggregate demand so far to the right that it triggers inflation. If tight monetary policy seeking to reduce inflation goes too far, it may push aggregate demand so far to the left that a recession begins. Figure 2(a) summarizes the chain of effects that connect loose and tight monetary policy to changes in output and the price level.

Try It

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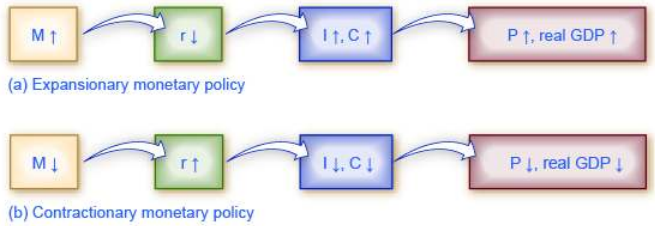


Figure 2.The Pathways of Monetary Policy. (a) In expansionary monetary policy the central bank causes the supply of money and loanable funds to increase, which lowers the interest rate, stimulating additional borrowing for investment and consumption, and shifting aggregate demand right. The result is a higher price level and, at least in the short run, higher real GDP. (b) In contractionary monetary policy, the central bank causes the supply of money and credit in the economy to decrease, which raises the interest rate, discouraging borrowing for investment and consumption, and shifting aggregate demand left. The result is a lower price level and, at least in the short run, lower real GDP.

Watch It

Watch this video to take yet another look at the way that monetary policy can, through a reaction chain, affect aggregate demand.

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Glossary

[glossary-page][glossary-term]countercyclical:[/glossary-term]
[glossary-definition]moving in the opposite direction of the business cycle of economic downturns and upswings[/glossary-definition]
[/glossary-page]

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13.13: Federal Reserve Actions and Quantitative Easing

Learning Objectives

- Evaluate Federal Reserve decisions over the last forty years
- Explain the significance of quantitative easing (QE)

Federal Reserve Actions Over Last Four Decades

For the period from the mid-1970s up through the end of 2007, Federal Reserve monetary policy can largely be summed up by looking at how it targeted the federal funds interest rate using open market operations. The Federal Reserve closely monitors the economy and considers when and if it should intervene, being mindful of the delicate tradeoff between unemployment and inflation.

Of course, telling the story of the U.S. economy since 1975 in terms of Federal Reserve actions leaves out many other macroeconomic factors that were influencing unemployment, recession, economic growth, and inflation over this time. The nine episodes of Federal Reserve action outlined in the sections below also demonstrate that the central bank should be considered one of the leading actors influencing the macro economy. As noted earlier, the single person with the greatest power to influence the U.S. economy is probably the chairperson of the Federal Reserve.

Figure 1 shows how the Federal Reserve has carried out monetary policy by targeting the federal funds interest rate in the last few decades. The graph shows the federal funds interest rate (remember, this interest rate is set through open market operations), the unemployment rate, and the inflation rate since 1975. Different episodes of monetary policy during this period are indicated in the figure.

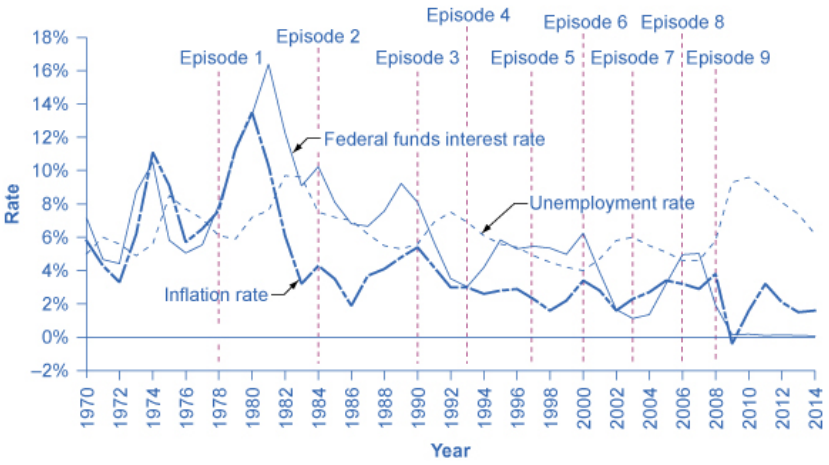


Figure 1. Monetary Policy, Unemployment, and Inflation. Through the episodes shown here, the Federal Reserve typically reacted to higher inflation with a contractionary monetary policy and a higher interest rate, and reacted to higher unemployment with an expansionary monetary policy and a lower interest rate.

EPISODE 1

Consider Episode 1 in the late 1970s. The rate of inflation was very high, exceeding 10% in 1979 and 1980, so the Federal Reserve used tight monetary policy to raise interest rates, with the federal funds rate rising from 5.5% in 1977 to 16.4% in 1981. By 1983, inflation was down to 3.2%, but aggregate demand contracted sharply enough that back-to-back recessions occurred in 1980 and in 1981–1982, and the unemployment rate rose from 5.8% in 1979 to 9.7% in 1982.

EPISODE 2

In Episode 2, when the Federal Reserve was persuaded in the early 1980s that inflation was declining, the Fed began slashing interest rates to reduce unemployment. The federal funds interest rate fell from 16.4% in 1981 to 6.8% in 1986. By 1986 or so, inflation had fallen to about 2% and the unemployment rate had come down to 7%, and was still falling.

EPISODE 3

However, in Episode 3 in the late 1980s, inflation appeared to be creeping up again, rising from 2% in 1986 up toward 5% by 1989. In response, the Federal Reserve used contractionary monetary policy to raise the federal funds rates from 6.6% in 1987 to 9.2% in 1989. The tighter monetary policy stopped inflation, which fell from above 5% in 1990 to under 3% in 1992, but it also helped to cause the recession of 1990–1991, and the unemployment rate rose from 5.3% in 1989 to 7.5% by 1992.

EPISODE 4

In Episode 4, in the early 1990s, when the Federal Reserve was confident that inflation was back under control, it reduced interest rates, with the federal funds interest rate falling from 8.1% in 1990 to 3.5% in 1992. As the economy expanded, the unemployment rate declined from 7.5% in 1992 to less than 5% by 1997.

Watch it

This video reviews the major monetary tools we've learned about thus far, which were the main tools used prior to the recession in 2008.

An interactive or media element has been excluded from this version of the text. You can view it online here: http://pb.libretexts.org/mlum/?p=571

EPISODES 5 AND 6

In Episodes 5 and 6, the Federal Reserve perceived a risk of inflation and raised the federal funds rate from 3% to 5.8% from 1993 to 1995. Inflation did not rise, and the period of economic growth during the 1990s continued. Then in 1999 and 2000, the Fed was concerned that inflation seemed to be creeping up so it raised the federal funds interest rate from 4.6% in December 1998 to 6.5% in June 2000. By early 2001, inflation was declining again, but a mild recession occurred in 2001. Between 2000 and 2002, the unemployment rate rose from 4.0% to 5.8%.

EPISODES 7 AND 8

In Episodes 7 and 8, the Federal Reserve conducted a loose monetary policy and slashed the federal funds rate from 6.2% in 2000 to just 1.7% in 2002, and then again to 1% in 2003. They actually did this because of fear of Japan-style deflation; this persuaded them to lower the Fed funds further than they otherwise would have. The recession ended, but, unemployment rates were slow to decline in the early 2000s. Finally, in 2004, the unemployment rate declined and the Federal Reserve began to raise the federal funds rate until it reached 5% by 2007.

EPISODE 9

In Episode 9, as the Great Recession took hold in 2008, the Federal Reserve was quick to slash interest rates, taking them down to 2% in 2008 and to nearly 0% in 2009. When the Fed had taken interest rates down to near-zero by December 2008, the economy was still deep in recession. Open market operations could not make the interest rate turn negative. The Federal Reserve had to think "outside the box."

Creating New Monetary Policy tools

At the beginning of the Great Recession the Federal Reserve found itself in a precarious position. Short term interest rates were close to zero, making it hard to conduct traditional open market operations. After all, expansionary monetary policy is carried out when the Fed purchases Treasury bills (T-bills) to lower short-term interest rates. If short-term rates are close to zero, there is little room for them to fall and stimulate spending. To deal with this situation, the Fed and the U.S. Treasury tried a number of innovative initiatives:

- The Fed began conducting quantitative easing (or QE, discussed in detail below). In quantitative easing, the Fed buys longer-term assets, instead of just T-bills, thus, lowering long-term interest rates, which they hoped would stimulate spending. QE includes the purchase of non-traditional assets like mortgage-backed securities, as well as Treasury and Corporate debt. By doing this, the Fed injected money into the banking system and increased the amounts of funds available to lend to the business sector and consumers.
- The Fed also tried alternative ways to increase reserves in the banking system, to provide at least the potential for banks to increase loans. To this end, the Fed began paying interest on bank reserves, something they had not done previously. This

provided an incentive for banks to hold more reserves.

- In addition, the Fed made more aggressive use of repurchase agreements (or Repos). Repurchase agreements are essentially overnight loans in which central banks exchange cash for T-bills held by commercial banks, thus increasing holdings of bank reserves. These transactions are automatically reversed (i.e. the T-bills are "repurchased") at a small profit to the banks after 24 hours, so this has a very short term impact on bank reserves.
- While not technically monetary policy if we are speaking strictly, the Congress and the President also passed several pieces of legislation that would stabilize the financial market. The Troubled Asset Relief Program (TARP), passed in late 2008, allowed the U.S. Treasury to inject cash into troubled banks and other financial institutions and help support General Motors and Chrysler as they faced bankruptcy and threatened job losses throughout their supply chain. The Treasury purchased "troubled assets" from the banks, allowing them to clean up their balance sheets and begin lending again. The TARP was criticized as a "bail-out" of large banks by taxpayers, but while the Treasury purchased some $450 billion in troubled assets, they were able to recoup all but $37 billion by selling those assets once financial markets had stabilized. The purpose of these initiatives was not to bail out banks, or even protect depositors, but rather to protect the integrity of the payments system.

Watch It

Watch this video to learn more about the Fed's new monetary policy tools, which were developed in response to the 2008 recession.

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It is not yet clear the extent to which these new monetary policy tools will continue to be used once interest rates return to normal levels, allowing traditional open market operations to be used again. For now at least, they remain part of the Fed's toolkit.

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Quantitative Easing

The most powerful and commonly used of the three traditional tools of monetary policy—open market operations—works by expanding or contracting the money supply in a way that influences the interest rate. In late 2008, as the U.S. economy struggled with recession, the Federal Reserve had already reduced the interest rate to near-zero. With the recession still ongoing, the Fed decided to adopt an innovative and nontraditional policy known as **quantitative easing (QE)**. This is the purchase of long-term government and private mortgage-backed securities by central banks to make credit available so as to stimulate aggregate demand.

Quantitative easing differed from traditional monetary policy in several key ways. First, it involved the Fed purchasing long term Treasury bonds, rather than short term Treasury bills. The logic was the following: investment spending decisions are typically based on long term interest rates. Home mortgages, for example, have maturities up to 30 years. With traditional monetary policy, the idea is that since short term and long term interest rates tend to rise or fall together, lowering short term rates will ultimately lower long term rates and stimulate investment spending. Quantitative easing attempted to skip the middle step and directly lower long-term interest rates.

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This leads to a second way QE is different from traditional monetary policy. Instead of purchasing Treasury securities, the Fed also began purchasing private mortgage-backed securities, something it had never done before. One of the triggers of the financial crisis, which precipitated the recession, was the collapse of the market for mortgage-backed securities (MBS). Mortgage-backed securities were financial assets consisting of bundles of individual mortgages. The idea behind MBS was that by holding many mortgages in a single asset, if a few mortgages went into default, which happens even in normal times, the rest would maintain the value of the broader asset. Since each mortgage paid interest, so did the MBS. When the housing market collapsed and many mortgages defaulted, no one knew what the mortgage-backed securities were worth. As a result, they were termed "toxic assets," which put the financial institutions holding those securities on very shaky ground. By offering to purchase mortgage-backed

securities, the Fed was both pushing long term interest rates down and also removing possibly “toxic assets” from the balance sheets of private financial firms, which would strengthen the financial system.

Quantitative easing (QE) occurred in three episodes:

1. During QE_1, which began in November 2008, the Fed purchased $600 billion in mortgage-backed securities from government enterprises Fannie Mae and Freddie Mac.
2. In November 2010, the Fed began QE_2, in which it purchased $600 billion in U.S. Treasury bonds.
3. QE_3, began in September 2012 when the Fed commenced purchasing $40 billion of additional mortgage-backed securities per month. This amount was increased in December 2012 to $85 billion per month. The Fed ended the program in late 2014 after the unemployment rate had slipped under 6 percent.

The quantitative easing policies adopted by the Federal Reserve (and by other central banks around the world) are usually thought of as temporary emergency measures. If these steps are, indeed, to be temporary, then the Federal Reserve will need to stop making these additional loans and sell off the financial securities it has accumulated. The concern is that the process of quantitative easing may prove more difficult to reverse than it was to enact.

Try It

https://assessments.lumenlearning.co...sessments/7652

Watch It

Watch the selected clip from this video to review some of the Fed’s tools for enacting monetary policy and to see how quantitative easing was used following the 2008 recession.

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Glossary

[glossary-page][glossary-term]countercyclical:[/glossary-term]
[glossary-definition]moving in the opposite direction of the business cycle of economic downturns and upswings[/glossary-definition][glossary-term]federal funds rate:[/glossary-term]
[glossary-definition]the interest rate at which one bank lends funds to another bank overnight[/glossary-definition][glossary-term]quantitative easing (QE):[/glossary-term]
[glossary-definition]the purchase of long term government and private mortgage-backed securities by central banks to make credit available in hopes of stimulating aggregate demand[/glossary-definition]
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13.14: Putting It Together- Monetary Policy



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In this module we learned about the second important tool by which the government can influence the macro economy, that is, monetary policy. We explored the role of central banks. like the U.S. Federal Reserve, in conducting monetary policy, including:

- How the Fed regulates banks to protect the integrity of the payments system
- How monetary policy differs from fiscal policy
- How the equilibrium interest rate is determined in financial markets
- How the Fed uses monetary policy to manipulate interest rates and credit conditions to stimulate or contract economic activity
- How monetary policy affects GDP and the price level (using the AD-AS model)

In short, we learned how monetary policy is supposed to work, but also how the Fed has improvised in recent years to make monetary policy work when traditional methods were ineffective. In the next module, we will continue this theme by exploring real world complications that prevent fiscal and monetary policy working as easily as one might wish, and also how policy makers deal with those complications.

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13.15: Discussion- Impact of Low Interest Rates on Monetary Policy

Respond to the following prompts in a post with a minimum of 200 words, then comment on at least TWO other posts.

- Since the end of the Great Recession, interest rates have been at historic lows—in some cases, close to zero. How is expansionary monetary policy, or more specifically a open market purchase, supposed to work? How do near-zero interest rates limit the ability of expansionary monetary policy to work?
- How has the Fed responded to this quandary? That is, what policies has the Fed conducted?
- In your opinion, how effective has the Fed's policy been as a response to the Great Recession? What evidence can you suggest to support your position?

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13.16: Assignment- Chair the Fed

Monetary Policy: Think you have what it takes to run our country's central bank?

The President of the United States has nominated you and the U.S. Senate has confirmed you to serve as the Chair of the Federal Reserve. Your job is to set monetary policy to achieve full employment and low price inflation. The way you do that is by adjusting the Federal Funds Rate (FFR) up or down. Your term will last 4 years (16 quarters). See if you can achieve full employment and low inflation as Chair of the Fed.

Go to this website: https://sffed-education.org/chairthefed/default.html .

Click "Play Now" to begin the game.

1. According to monetary theory that you studied in this module, how does a change in the Federal Funds Rate affect the inflation rate? How does it affect the unemployment rate?
2. Given the current inflation and unemployment rates, how should you adjust the FFR? That is, should you increase or decrease the FFR, or leave it the same?
3. Choose the FFR for the next quarter. What did you adjust it to? What was the impact on the inflation rate? What was the impact on the unemployment rate? Did you obtain the impact you were hoping for? Why or why not?
4. Continue to choose the FFR for the rest of the game, making a table to keep track of the FFR you choose, and the inflation and unemployment rates you obtained.
5. How well did you do at keeping the inflation rate close to the target, and the unemployment rate close to the natural rate? Feel free to play the game as many times as you like to see if you can improve your results.
6. What conclusions can you draw about this game?
7. What conclusions can you draw about the job of the Fed in the real world?

Rubric

Criteria	Not Evident	Developing	Proficient	Distinguished	Weight
Correctly explain the theory for how an increase the in Federal Funds Rate affects the inflation rate and unemployment rate.					4
Given the initial inflation and unemployment rates, make a good case for whether the FFR should be raised or lowered.					2
Show the table of FFR and results of playing the game through 16 periods.					2
Explain why you think the results you obtained were different than you hoped for.					4
Explain how well you did, what conclusions you drew about the game, and about actual monetary policy.					6
					Total: 20

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13.17: Assignment- Problem Set — Monetary Policy

Click on the following link to download the problem set for this module:

- Monetary Policy Problem Set

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CHAPTER OVERVIEW

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14.2: Introduction to Keynesian and Neoclassical Policy Prescriptions
14.3: Viewpoints on Government Policy
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14.1: Why It Matters- Policy Applications

Why apply fiscal and monetary policies in macroeconomic situations?



Figure 1. It's finally time to apply the concepts you've learned about fiscal and monetary policy.

The module really ties together everything we've learned about macroeconomics. In earlier modules we introduced the concepts of fiscal and monetary policy. In this module, we examine the two types of policy in more detail, incorporating all the pros and cons of the real world. By extension, we will be evaluating the policy prescriptions of Keynesian and neoclassical economics. As you work through this module, use the following questions to guide your thinking:

- Under what circumstances do fiscal and monetary policy work well, or not so well, in managing the economy?
- For the activist Keynesians, what are the limits to fiscal and monetary policy that you would endorse, and why?
- For the laissez-faire neoclassicals, what is the minimalist fiscal and monetary policy that makes sense, and why?
- How is macroeconomic policy is the real world more complicated than in theory?

Suppose you are asked to provide guidance about the macro economy in a given situation. Knowing what you know about the strengths and weaknesses of using fiscal or monetary policy, what would you recommend? For example, suppose after a period of solid economic growth, low unemployment, and modest inflation, the economy slows down a bit and unemployment shoots up several percentage points. What, if anything, should be done about that?

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14.2: Introduction to Keynesian and Neoclassical Policy Prescriptions

What you'll learn to do: compare viewpoints on government spending and taxes between the Keynesian and Neoclassical perspectives



In previous modules, we've learned about both the Keynesian and Neoclassical perspectives on the macro economy. Neoclassicals take a laissez-faire approach to macro policy. They believe that the economy is self-correcting, and doesn't need government intervention. Indeed, we will see that Neoclassicals believe that government intervention is counterproductive. Keynesians take a more active approach. They believe that the economy takes too long to correct itself and that government has a responsibility to speed things up and minimize the adverse effects of unemployment, inflation and other economic problems.

In this section, we will drill down into the two perspectives to develop a more nuanced understanding of their strengths and weaknesses. In the process, we will create a stronger understanding of both the power and the limits of fiscal and monetary policy.

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14.3: Viewpoints on Government Policy

Learning Objectives

- Summarize the neoclassical views on the effectiveness of fiscal and monetary policy
- Summarize the Keynesian views on the effectiveness of fiscal and monetary policy, including the importance of the expenditure multiplier

Reviewing the Neoclassical Perspective

Neoclassical economics covers several distinct schools of thought, including traditional neoclassical economics, supply side economics, and new classical economics. Each of these schools of thought shares a number of key beliefs, which makes them neoclassical. The first belief is that the macro economy is self-correcting, or that there is no need for government intervention. The second belief, for reasons to be discussed shortly, is that government "fine tuning" of the economy either through fiscal or monetary policy would be unwise and ineffective.

In general, neoclassical economists favor low taxes to stimulate aggregate supply and economic growth. They also favor limited government spending–they believe in spending on national defense, but not much for transfer policies like Social Security, Medicare, Medicaid or other types of welfare spending. Neoclassicals also favor a more passive monetary policy than Keynesians.

President Reagan advocated tax cuts in 1981 on the basis of their supply-side effects. Coupled with increased defense spending in the early 1980s, fiscal policy under Mr. Reagan clearly stimulated aggregate demand by increasing both consumption and investment. Falling inflation and accelerated growth were signs that supply-side factors may also have been at work during that period. President George W. Bush's chief economic adviser, N. Gregory Mankiw, argued that the Bush tax cuts would encourage economic growth, a supply-side argument. Mr. Bush's next chief economic adviser, Ben Bernanke, who became the next chairman of the Federal Reserve Board in 2006, made a similar argument and urged that the Bush tax cuts be made permanent.

Reviewing the Keynesian Perspective



Figure 1. Famous Economist. Paul Krugman, one of the most prominent Keynesian economists of the 21st Century.

Keynesians believe, based on the experience of the Great Depression of the 1930s and more recently, the Great Recession of 2007-2009, that the economy can be in equilibrium at a level of GDP that does not correspond to potential, so that a GDP gap exists. This means that the economy will not be at full employment. Such an equilibrium can correspond to either a recession or an inflationary boom. In addition, even if the economy is self-correcting, the process can be so slow that the GDP will not close, and employment will not be full for an extended period of time.

Because of this belief that either the economy is not self-correcting, or that the correction may take a long period of time, Keynesians also believe that government has a responsibility to manage the economy. They encourage stimulating the economy during recessionary times and slowing the economy down during booms, using a combination of fiscal and monetary policy. Let's consider how this might work in the real world.

One criticism of early Keynesians was that they didn't believe monetary policy was very useful. The reality is more nuanced. Keynes was the preeminent monetary economist of his generation. Indeed, before he wrote *The General Theory*, his magnum opus

on macroeconomics, he wrote a two volume *Treatise on Money*. To say that he didn't understand or believe monetary policy could be effective was simply not true. That said, he did identify a situation when expansionary monetary policy wouldn't work. We'll look at this "liquidity trap" shortly. More generally, Keynesians believe that monetary policy is an effective tool for managing the macro economy, through open market operations.

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Try It

John Maynard Keynes, in his book *The General Theory*, defined the concept of the liquidity trap. The **liquidity trap** refers to a situation where people are willing to hold an infinite amount of cash, because interest rates are so low that there is almost no opportunity cost of doing so–the reward for putting your money in an interest earning asset is essentially zero. In such a situation, expansionary monetary policy is powerless to move the economy forward. The reason why is that monetary policy works by lowering interest rates to increase borrowing and investment and consumption spending. This would stimulate aggregate demand and increase GDP and employment. But suppose the Fed conducts an open market purchase, but the sellers simply hold onto the money instead of depositing it in a bank account. Then interest rates don't fall and the process is short circuited. Keynes argued that in such a situation, the appropriate policy response was expansionary fiscal policy.

For some 70 years after publication of *The General Theory*, most economists viewed the Liquidity Trap as an interesting theoretical idea, but one that never happened in the real world. Then came the Global Financial Crisis and the Great Recession when interest rates fell to zero and monetary policy seemed ineffective.

During the Great Recession, the Fed reduced short term interest rates to near zero, with little effect on aggregate demand. In such a situation, traditional open market operations seemed unable to move the economy forward. Indeed, once it became clear that the recession would be very deep, the U.S. Congress passed the American Recovery and Reinvestment Act of 2009. ARRA was a bipartisan agreement to stimulate the economy through fiscal stimulus amounting to some $800 billion, some one third in tax cuts and two thirds in government spending increases on healthcare, infrastructure, education and other areas. Most macroeconomists agree that the fiscal stimulus hastened the end of the recession; some argue that the the stimulus should have been even larger.

The Expenditure Multiplier

Another one of the key claims of Keynes was the existence of an "expenditure multiplier." Remember from previous readings that Keynes said that aggregate demand was highly volatile, that even if the economy started at a level of GDP where it equaled its potential so that the economy was at full employment, AD could shift abruptly causing a recessionary or inflationary gap. In the Keynesian model, not only did changes in spending cause GDP to change, but the change in GDP was more than proportionate than the initial change in autonomous spending. In other words, aggregate demand is powerful since a change in spending results in a multiplied change in GDP. This spending multiplier was part of the reasoning behind the Keynesian view that fiscal policy is a powerful tool for managing the economy. While estimates of the size of fiscal multipliers vary, with spending multipliers typically greater than tax multipliers, the Council of Economic Advisors under the Obama Administration estimated a multiplier for the ARRA of about 1.5.

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Learning Objectives

[glossary-page][glossary-term]liquidity trap:[/glossary-term]
[glossary-definition]Keynesian idea that when interest rates are very low, people are willing to hold cash, rather than put it into financial markets, eliminating the ability for expansionary monetary policy to work[/glossary-definition][/glossary-page]

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14.4: Introduction to the Phillips Curve

What you'll learn to do: explain the reasoning behind the theory of the Phillips Curve and why it may not hold



Figure 1. This woman is protesting while holding a "pink slip", or a notice of dismissal from employment. The Philipps Curve is a supposed inverse relationship between the level of unemployment and the rate of inflation.

The Phillips Curve is a key part of Keynesian economics, at least the Keynesian economics of the 1960s. In this section, you'll learn what makes the Phillips curve Keynesian, and why neoclassicals believe it may not hold in the long run. This speaks to the effectiveness of demand management policies, which is a major subject of this module.

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14.5: The Phillips Curve

Learning Objectives

- Explain the Phillips curve, noting its impact on the theories of Keynesian economics
- Demonstrate how the Phillips Curve can be derived from the aggregate supply curve

The Discovery of the Phillips Curve

In the 1950s, A.W. Phillips, an economist at the London School of Economics, was studying 60 years of data for the British economy and he discovered an apparent inverse (or negative) relationship between unemployment and wage inflation. Subsequently, the finding was extended to the relationship between unemployment and price inflation, which became known as the **Phillips Curve.** Why was there an trade-off between unemployment and inflation?

The original Keynesian view using the AD-AS model was that AS was "L"-shaped. At any level of GDP below potential, changes in aggregate demand were thought to have no effect on the price level, only on GDP. Only when GDP reached potential would changes in aggregate demand affect prices, but not GDP. You can see this in the original Keynesian AD-AS model, Figure 1, which we first presented in the module on Keynesian Economics.

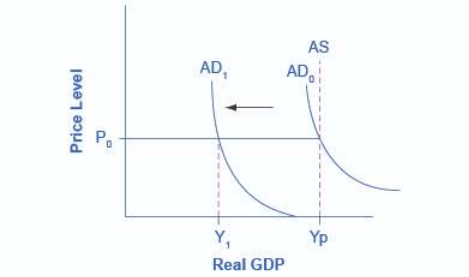


Figure 1. The Pure Keynesian AD–AS Model. The Keynesian View of the AD–AS Model uses an AS curve which is horizontal at levels of output below potential and vertical at potential output. Thus, changes in AD only affect GDP when below potential output, but only affect the price level when at potential output.

Most Keynesian economists today have a more nuanced view of the AS curve. When the economy is far from potential GDP, changes in AD mostly affect output but not the price level. When the economy is closer to potential GDP, changes in AD affect output and the price level. And when the economy is at or beyond potential GDP changes in AD only affect the price level. This yields the more curved AS that we are familiar with, shown in Figure 2.

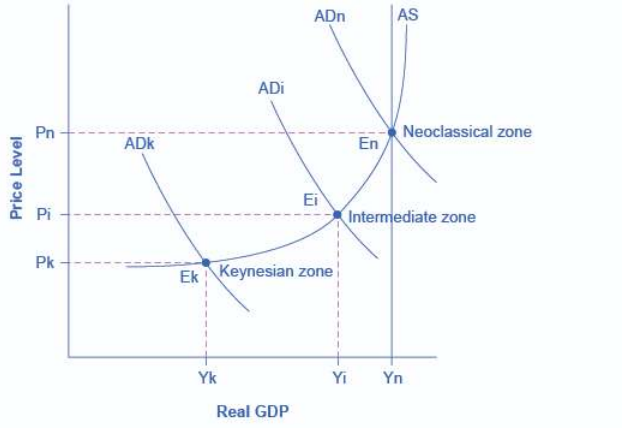


Figure 2. Modern Keynesian View of the Aggregate Supply Curve. Near the equilibrium Ek, in the Keynesian zone at the far left of the AS curve, small shifts in AD, either to the right or the left, will affect the output level Yk, but will not much affect the price level. In the Keynesian zone, AD largely determines the quantity of output. Near the equilibrium En, in the neoclassical zone, at the far right of the AS curve, small shifts in AD, either to the

right or the left, will have relatively little effect on the output level Yn, but instead will have a greater effect on the price level.

So where does that leave us with the Phillips Curve? Keynesian theory implied that during a recession, when GDP was below potential and unemployment was high, inflationary pressures would be low. Alternatively, when the level of output is at or even pushing beyond potential GDP, the economy is at greater risk for inflation. This yields the Phillips Curve relationship.

Figure 3 shows a theoretical Phillips curve, and the following feature shows how the pattern appears for the United States.

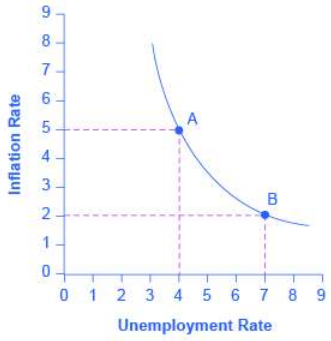


Figure 3. A Keynesian Phillips Curve Tradeoff between Unemployment and Inflation. A Phillips curve illustrates a tradeoff between the unemployment rate and the inflation rate; if one is higher, the other must be lower. For example, point A illustrates an inflation rate of 5% and an unemployment rate of 4%. If the government attempts to reduce inflation to 2%, then it will experience a rise in unemployment to 7%, as shown at point B.

Try It

https://assessments.lumenlearning.co...sessments/7659
https://assessments.lumenlearning.co...sessments/7660

The PHILLIPS CURVE FOR THE UNITED STATES

Step 1. Go to this website to see the 2005 Economic Report of the President.

Step 2. Scroll down and locate Table B-63 in the Appendices. This table is titled “Changes in special consumer price indexes, 1960–2004.”

Step 3. Download the table in Excel by selecting the XLS option and then selecting the location in which to save the file.

Step 4. Open the downloaded Excel file.

Step 5. View the third column (labeled “Year to year”). This is the inflation rate, measured by the percentage change in the Consumer Price Index.

Step 6. Return to the website and scroll to locate the Appendix Table B-42 “Civilian unemployment rate, 1959–2004.

Step 7. Download the table in Excel.

Step 8. Open the downloaded Excel file and view the second column. This is the overall unemployment rate.

Step 9. Using the data available from these two tables, plot the Phillips curve for 1960–69, with unemployment rate on the x-axis and the inflation rate on the y-axis. Your graph should look like Figure 4.

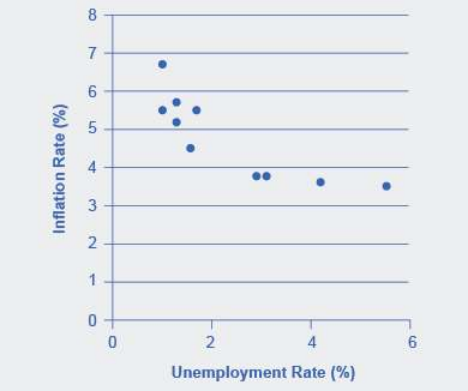


Figure 4. The Phillips Curve from 1960–1969. This chart shows the negative relationship between unemployment and inflation.

Step 10. Plot the Phillips curve for 1960–1979. What does the graph look like? Do you still see the tradeoff between inflation and unemployment? Your graph should look like Figure 5.

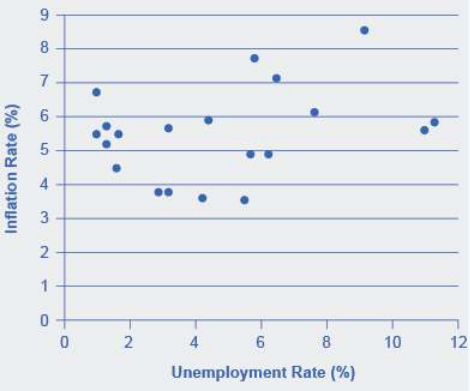


Figure 5. U.S. Phillips Curve, 1960–1979. The tradeoff between unemployment and inflation appeared to break down during the 1970s as the Phillips Curve shifted out to the right.

Over this longer period of time, the Phillips curve appears to have shifted out. There is no longer a tradeoff.

The Instability of the Phillips Curve

By the mid-1960s, the Phillips Curve was a key part of Keynesian Economics. The relationship was seen as a policy menu. A nation could choose low inflation and high unemployment, or high inflation and low unemployment, or anywhere in between. Expansionary fiscal and monetary policy could be used to move up the Phillips curve. Contractionary fiscal and monetary policy could be used to move down the Phillips curve. An administration could choose any point on the Phillips Curve as desired.

Then a curious thing happened. When policymakers tried to exploit the tradeoff between inflation and unemployment, the result was an increase in both inflation and unemployment. What had happened? The Phillips curve shifted, but why? The U.S. economy experienced this pattern in the deep recession from 1973 to 1975, and again in back-to-back recessions from 1980 to 1982. Many nations around the world saw similar increases in unemployment and inflation, and this pattern became known as **stagflation**. (Recall that stagflation is an unhealthy combination of high unemployment and high inflation.) Perhaps most important, stagflation was a phenomenon that could not be explained by traditional Keynesian economics.

Try It

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watch it

Watch this short video for a summary of the Phillips curve and to learn more about the relationship between inflation and unemployment.

A link to an interactive elements can be found at the bottom of this page.

Try It

These questions allow you to get as much practice as you need, as you can click the link at the top of the first question ("Try another version of these questions") to get a new set of questions. Practice until you feel comfortable doing the questions.

[ohm_question]154506-154508-154519-154523[/ohm_question]

Learning Objectives

[glossary-page]
[glossary-term]contractionary fiscal policy: [/glossary-term]
[glossary-definition]tax increases or cuts in government spending designed to decrease aggregate demand and reduce inflationary pressures [/glossary-definition][glossary-term]expansionary fiscal policy: [/glossary-term][glossary-definition]tax cuts or increases in government spending designed to stimulate aggregate demand and move the economy out of recession[/glossary-definition][glossary-term]Phillips curve:[/glossary-term][glossary-definition]the tradeoff between unemployment and inflation[/glossary-definition][glossary-term]Stagflation: [/glossary-term][glossary-definition]a simultaneous increase in between unemployment and inflation[/glossary-definition]
[/glossary-page]

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14.6: Policy Implications- No Phillips Curve Tradeoff in the Long Run

Learning Objectives

- Differentiate between the Keynesian and Neoclassical views of the Phillips Curve

In the previous section, we introduced the **Phillips Curve,** which is the Keynesian theory that there is a stable trade-off between inflation and unemployment. We also explained how the Phillips Curve is derived from the aggregate supply curve. The short run upward sloping aggregate supply curve implies a downward sloping Phillips curve; thus, there is a tradeoff between inflation and unemployment in the short run. In this section, we will explain how a neoclassical long-run aggregate supply curve will imply a vertical shape for the Phillips curve, indicating no long run tradeoff between inflation and unemployment.

What Causes the Phillips Curve to Shift?

We observed that the Phillips Curve relationship seemed to fall apart when the curve began shifting during the 1970s. How can we explain what happened?

Economists have concluded that two factors cause the Phillips curve to shift. The first is changes in people's expectations about inflation, and the second is supply shocks, like the Oil Crisis of the mid-1970s, which first brought stagflation into our vocabulary. Let's explore each of these reasons.

Milton Friedman, the founder of Monetarist Economics, a Neoclassical perspective, explained the first factor. He pointed out that there may be an apparent tradeoff between inflation and unemployment *when workers expect no inflation*, but when they realize inflation is occurring, workers demand higher wages, and the tradeoff disappears. Robert Lucas, a prominent New Classical economist, described this as an epiphenomenon, that is, a statistical mirage. Starting from full employment (what economists call the natural rate of unemployment), an increase in aggregate demand causes a movement up the short run aggregate supply curve, raising the price level, while increasing real GDP and thus reducing unemployment. When workers realize prices are rising, they raise their inflationary expectations and demand increased wages to compensate for the higher cost of living. Increased wages cause the short run aggregate supply curve to shift up, with the result that we end up with higher inflation, but with the same (natural) rate unemployment as when we started. Watch the following video to see how this is explained graphically.

Watch It

Watch this video to see how the long run, vertical Phillips Curve is derived from the long run, neoclassical aggregate supply curve.

A link to an interactive elements can be found at the bottom of this page.

The Neoclassical Phillips Curve

Figure 1(a) shows the vertical, long run AS curve, with three different levels of aggregate demand, resulting in three different equilibria, at three different price levels. At every point along that vertical AS curve, potential GDP and the rate of unemployment remains the same. Assume that for this economy, the natural rate of unemployment is 5%. As a result, the long-run Phillips curve relationship, shown in Figure 1(b), is a vertical line, rising up from 5% unemployment, at any level of inflation.

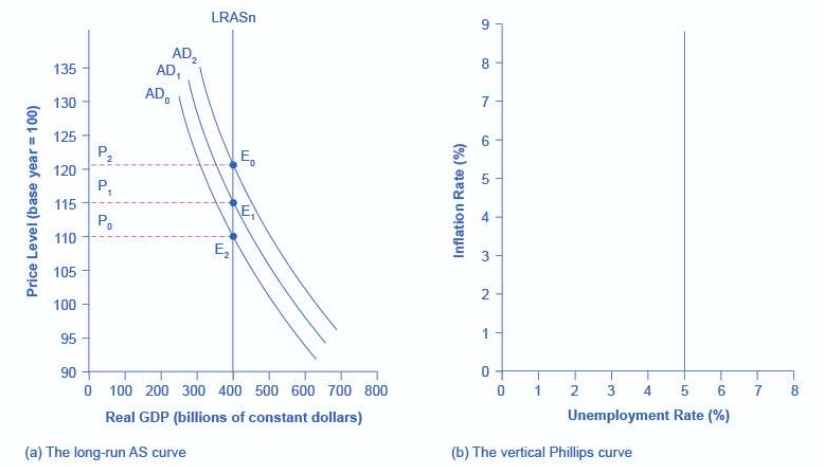


Figure 1. Neoclassical View of the Philips Curve. (a) With a vertical LRAS curve, shifts in aggregate demand do not alter the level of output but do lead to changes in the price level. Because output is unchanged between the equilibria E_0, E_1, and E_2, all unemployment in this economy will be due to the natural rate of unemployment. (b) If the natural rate of unemployment is 5%, then the Phillips curve will be vertical. That is, regardless of changes in the price level, the unemployment rate remains at 5%.

An increase in aggregate demand from AD_0 to AD_1 to AD_2 will ultimately cause inflation, but no long run change in unemployment. The unemployment rate on this long-run Phillips curve will be the natural rate of unemployment. Milton Friedman, the famous Monetarist economist and winner of the Nobel Prize in economics, called this the **Natural Rate Hypothesis**. He summed up the neoclassical view of the long-term Phillips curve tradeoff in a 1967 speech: "[T]here is always a temporary trade-off between inflation and unemployment; there is no permanent trade-off."

Traditional Keynesian economics did not account for the possibility of supply shocks, that is shifts in the short run aggregate supply curve. A negative supply shock, like a significant increase in the price of energy, causes an upward shift in AS, which raises prices, and reduces GDP raising unemployment. In the long run, unemployment returns to the natural rate, while inflation is at a higher level. Thus, both factors (changes in inflationary expectations and supply shocks) cause the Phillips Curve to be vertical with no long run tradeoff between inflation and unemployment.

Try It

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https://assessments.lumenlearning.co...sessments/7662

Learning Objectives

[glossary-page][glossary-term]Natural Rate Hypothesis[/glossary-term]
[glossary-definition]Neoclassical view that since the long run aggregate supply curve is vertical, the long run Phillips Curve is also vertical; there is no tradeoff in the long run between inflation and unemployment[/glossary-definition][/glossary-page]

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14.7: Learn By Doing- The Phillips Curve

Try It

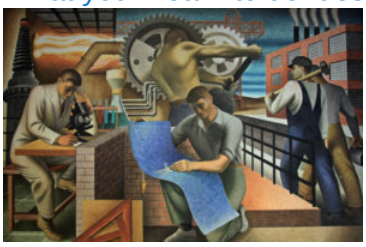
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[ohm_question sameseed=1]154821-154822-154823-154824-154825-154826-154827-154828-154829-154830-154831[/ohm_question]

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14.8: Introduction to New Classical Economics

What you'll learn to do: describe the basic tenets of new classical economics



Many contemporary macroeconomic models use rational expectations and Ricardian Equivalence theories in their predictions of future economic trends.

New Classical Economics is a neoclassical perspective that makes a stronger case for the ineffectiveness of fiscal & monetary policy to stabilize the economy. This case is based on two beliefs that are unique to New Classical Economics: the theories of rational expectations and Ricardian Equivalence.

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14.9: Rational Expectations

Learning Objectives

- Explain how the theory of rational expectations means that demand management policy is ineffective

Adaptive versus Rational Expectations

The natural rate hypothesis, which we learned about in an earlier section, argues that while there may be a tradeoff between inflation and unemployment in the short run, there is no tradeoff in the long run. In other words, the long run Phillips Curve is vertical. The natural rate hypothesis assumes that economic agents make their predictions based on **adaptive expectations**, basically extrapolating past values of inflation to predict future values of the variable. This scheme means that expectations will always lag behind reality, which allows expansionary fiscal or monetary policy to have short run positive effects on GDP and unemployment.

New Classical Economists ask why people don't learn that they consistently underestimate inflation? Shouldn't they learn from their mistakes? If individuals are rational, shouldn't they use all available information to improve their predictions of inflation, not just past values of it? Moreover, if inflation is determined through some systematic process, shouldn't finding out the process and using it to forecast improve one's predictions? These questions led to the theory of rational expectations.

Rational expectations says that economic agents should use all the information they have about how the economy operates to make predictions about economic variables in the future. The predictions may not always be right, but people should learn over time and improve their predictions.

These ideas were formalized by John Muth, who said expectations are rational if they produce predictions equal to the predictions of the underlying economic model. For example, if people know that expansionary fiscal or monetary policy will cause inflation in the long run, they will factor that into their expectations. In other words, when an expansionary policy occurs, people will immediately expect higher inflation. Thus, people will not be fooled even in the short run, so there will be no trade-off between inflation and unemployment. Expansionary policies will simply cause inflation to increase, with no effect on GDP or unemployment. What this means is that there is no Phillips Curve tradeoff in either the long run or the short run.

In sum, if economic agents have rational expectations, since the economy never diverges from the long run aggregate supply curve, **demand management policy**–using monetary and fiscal policy to influence aggregate demand, and thus, real GDP and employment–can never be effective.

Try It

Click through the slides in this presentation to review the distinction between adaptive and rational expectations.

A link to an interactive elements can be found at the bottom of this page.

Try It

https://assessments.lumenlearning.co...sessments/7663

Learning Objectives

[glossary-page][glossary-term]adaptive expectations:[/glossary-term]
[glossary-definition]the idea that people extrapolate from past values of some economic variable to predict future values of that variable [/glossary-definition]
[glossary-term]demand management policy:[/glossary-term][glossary-definition]using monetary and fiscal policy to influence aggregate demand, and thus, real GDP and employment [/glossary-definition]
[glossary-term]rational expectations:[/glossary-term]
[glossary-definition]idea that individuals will make decisions and predictions based on economic models and past trends[/glossary-definition][/glossary-page]

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14.10: Ricardian Equivalence

Learning Objectives

- Describe Ricardian equivalence and how government borrowing can affect private saving

Ricardian Equivalence: How Government Borrowing Affects Private Saving

Early Neoclassicals criticized Keynesian views about fiscal policy for ignoring the "crowding out" effect. Recall that crowding out is the idea that expansionary fiscal policy causes interest rates to rise which reduces business investment, limiting the effects of the fiscal expansion. The Keynesians ultimately acknowledged the crowding out effect, and the debate changed to how much crowding out occurs. Neoclassicals argue for complete crowding out, meaning that fiscal policy was completely ineffective since an increase in government spending would be completely offset by a decrease in private investment spending with no net effect on aggregate demand. Keynesians argue for incomplete crowding out; thus, fiscal policy would be weaker than originally thought, but still effective to a certain degree.

Robert Barro and other New Classical economists introduced another criticism of fiscal policy. If people have rational expectations, a change in government budgets may impact private saving. For example, whenever the government runs a budget deficit, people might reason: "Well, a higher budget deficit means that I'm just going to owe more taxes in the future to pay off all that government borrowing, so I'll start saving now." If the government runs budget surpluses, people might reason: "With these budget surpluses (or lower budget deficits), the country will be able to afford a tax cut sometime in the future. I won't bother saving as much now."

The theory that rational private households might shift their saving to offset government saving or borrowing is known as **Ricardian equivalence** because the idea has intellectual roots in the writings of the early nineteenth-century economist David Ricardo (1772–1823). If Ricardian equivalence holds completely true, then any increase in government expenditure that increases the budget deficit would lead to a corresponding decrease in consumption expenditure, as households save more in anticipation of their future tax liability. The net effect on aggregate demand then is zero and fiscal policy is entirely ineffective.

In practice, the private sector only sometimes and partially adjusts its savings behavior to offset government budget deficits and surpluses. Figure 1 shows the patterns of U.S. government budget deficits and surpluses and the rate of private saving—which includes saving by both households and firms—since 1980. The connection between the two is not at all obvious. In the mid-1980s, for example, government budget deficits were quite large, but there is no corresponding surge of private saving. However, when budget deficits turn to surpluses in the late 1990s, there is a simultaneous decline in private saving. When budget deficits get very large in 2008 and 2009, on the other hand, there is some sign of a rise in saving. A variety of statistical studies based on the U.S. experience suggests that when government borrowing increases by $1, private saving rises by about 30 cents. A World Bank study done in the late 1990s, looking at government budgets and private saving behavior in countries around the world, found a similar result.

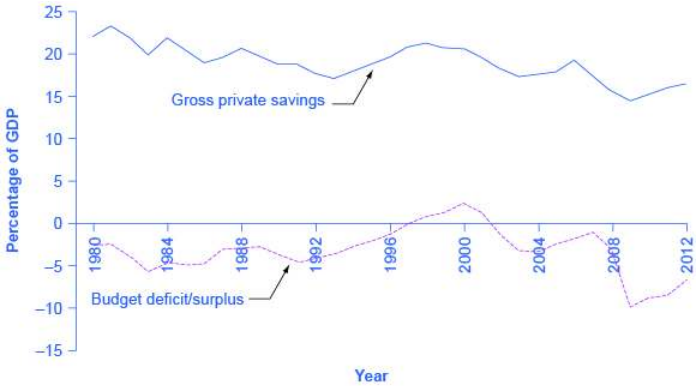


Figure 1. U.S. Budget Deficits and Private Savings. The theory of Ricardian equivalence suggests that any increase in government borrowing will be offset by additional private saving, while any decrease in government borrowing will be offset by reduced private saving. Sometimes this theory holds true, and sometimes it does not hold true at all. (Source: Bureau of Economic Analysis and Federal Reserve Economic Data).

So private saving does increase to some extent when governments run large budget deficits, and private saving falls when governments reduce deficits or run large budget surpluses. However, the offsetting effects of private saving compared to government borrowing are much less than one-to-one. Thus, fiscal policy can be effective, though perhaps less so in the absence of Ricardian equivalence. In addition, this effect can vary a great deal from country to country, from time to time, and over the short run and the long run.

If the funding for a larger budget deficit comes from international financial investors, then a budget deficit may be accompanied by a trade deficit. In some countries, this pattern of a **twin deficits** has set the stage for international financial investors first to send their funds to a country and cause an appreciation of its exchange rate and then to pull their funds out and cause a depreciation of the exchange rate and a financial crisis as well. It depends on whether funding comes from international financial investors.

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Watch It

Fiscal policy doesn't always work as designed, Some of these reasons are because businesses and consumers preempt policy changes or act in unpredictable ways. Consumers may demonstrate Ricardian equivalence by choosing to save money from a tax cut, which would cause no shift to aggregate demand and have no effect on the multiplier. Watch the selected clip from this video to learn more. The video beings by diving into ways that businesses may act in ways that offset fiscal or monetary policies.

A link to an interactive elements can be found at the bottom of this page.

Learning Objectives

[glossary-page][glossary-term]Ricardian equivalence:[/glossary-term]
[glossary-definition]the theory that rational private households might increase their saving in anticipation of future tax liabilities from government borrowing, and vice versa[/glossary-definition]
[glossary-term]twin deficits:[/glossary-term][glossary-definition]deficits that occur when a country is running both a trade and a budget deficit[/glossary-definition][/glossary-page]

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14.11: Introduction to Macro Policy Options in the Real World

What you'll learn to do: identify appropriate macro policy options in response to the state of the economy



Neither fiscal nor monetary policies are as mechanical and surgical effectively as we learned about in earlier modules. Fiscal policy is subject to crowding out, but crowding out only reduces the effectiveness of fiscal policy and doesn't eliminate it. Monetary policy may be better at slowing an economy down than stimulating it. Expectations clearly matter to economic decision making and economic policy, but do real world actors have Ricardian equivalence and rational expectations? Most economists would say no. Where does that leave us? Read on to learn more about the real-world applications of these policies.

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14.12: Practical Problems with Discretionary Fiscal and Monetary Policy

Learning Objectives

- Describe and differentiate between types of policy lags
- Explain how policy lags, policy imprecision, time, and politics can complicate or compromise the effectiveness of fiscal and monetary policy

In principle, fiscal and monetary policy should be easy to implement. Increases in government spending or tax cuts stimulate aggregate demand and, assuming GDP is less than potential, the economy should grow. Tax cuts have the added advantage of possibly increasing aggregate supply. Expansionary monetary policy, by lowering interest rates, also increases aggregate demand and GDP. Contractionary fiscal and monetary policies operate in reverse. In practice, though, we've seen that fiscal and monetary policy are more complicated. Too much stimulus leads to inflation. Too much contraction leads to recession. So the question of how much stimulus or contraction is always important and difficult to determine in advance. Crowding out, sometimes but not always, reduces the effectiveness of fiscal policy. Rational expectations and Ricardian equivalence also can limit the effectiveness of fiscal and monetary policy.



Figure 1. The U.S. Congress determines fiscal policy in the U.S.

- **Legislative or Decision Lag.** Once policymakers become aware of the problem they need to decide what, if anything, to do. For fiscal policy, Congress would need to propose an appropriate fiscal policy bill. The bill goes into various Congressional committees for hearings, negotiations, votes, and then, if passed, eventually for the President's signature. Many fiscal policy bills about spending or taxes propose changes that would start in the next budget year or would be phased in gradually over time. Economists refer to the time it takes to pass a bill as the legislative lag. Similarly, the time necessary for the central bank to determine the appropriate policy response is called the decision lag. The Fed procedure involves only the Federal Open Market Committee and thus is likely to be quicker than the legislative lag for fiscal policy.



Figure 2. The Federal Open Market Committee determines U.S. monetary policy.

- **Implementation or Transmission Lag**. Once the government passes a fiscal policy bill it takes some time to disperse the funds to the appropriate agencies to implement the programs. Once the Fed decides on a monetary policy change, the change is implemented the next business day. Economists call the time it takes to start the projects or execute the monetary policy the implementation lag, which is somewhat slower for fiscal policy than monetary policy.
- **Impact or Effectiveness Lag**. The time it takes for the new policy to play out is called the impact lag. The change in monetary policy must percolate through the banking system, changing the quantity of loans and affecting interest rates. When interest rates change, businesses must change their investment levels and consumers must change their borrowing patterns when

purchasing homes or cars. Then it takes time for these changes to filter through the rest of the economy. For fiscal policy, the impact lag may be shorter, since government agencies simply need to spend additional funds, or tax cuts appear in people's pay checks, which they can then spend.

A link to an interactive elements can be found at the bottom of this page.

Policy Imprecision

Fiscal and monetary policies don't always work out as planned because the tools are of varying precision. The Fed can increase the amount of reserves in the banking system, but it can't guarantee that banks convert all their excess reserves to loans. Similarly, whenever depositors remove cash from their accounts, the money multiplier falls. Even when interest rates fall the amount the Fed wishes, that doesn't guarantee households and businesses will increase their borrowing as much as the Fed hopes, which means that aggregate demand will not increase according to plan. Thus, for any given monetary policy action, the extent to which it has full effect depends on the responses of banks, depositors, and borrowers. These the Fed cannot control.

The effect of tax cuts depends on what households and businesses do with the money they get back from taxes. Demand management policies depend on households increasing consumption expenditures and businesses increasing investment expenditures. Any given tax cut may bring about more or less additional spending. Additional government spending is perhaps the most precise form of stimulus–if the Congress increases spending by $100 billion, then aggregate demand increases by that much. But even in the case, the exact level of fiscal policy that the government should implement is never completely clear. Should it increase the budget deficit by 0.5% of GDP? By 1% of GDP? By 2% of GDP? In an AD/AS diagram, it is straightforward to sketch an aggregate demand curve shifting to the potential GDP level of output. In the real world, we only know roughly, not precisely, the actual level of potential output, and exactly how a spending cut or tax increase will affect aggregate demand is always somewhat controversial. Also unknown is the state of the economy at any point in time. When the Great Recession began to play out, during the early days of the Obama administration, no one at the time knew the true extent of the economy's output gap. For all these reasons, discretionary fiscal and monetary policy is as much an art as a science.

Temporary and Permanent Fiscal Policy

An additional complication to policy effectiveness is whether the policy is explicitly temporary or permanent. A temporary tax cut or spending increase will explicitly last only for a year or two, and then revert back to its original level. A permanent tax cut or spending increase is expected to stay in place for the foreseeable future. The effect of temporary and permanent fiscal policies on aggregate demand can be very different. Consider how you would react if the government announced a tax cut that would last one year and then be repealed, in comparison with how you would react if the government announced a permanent tax cut. Most people and firms will react more strongly to a permanent policy change than a temporary one.

This fact creates an unavoidable difficulty for countercyclical fiscal policy. The appropriate policy may be to have an expansionary fiscal policy with large budget deficits during a recession, and then a contractionary fiscal policy with budget surpluses when the economy is growing well. But if both policies are explicitly temporary ones, they will have a less powerful effect than a permanent policy.

Structural Economic Change Takes Time

When an economy recovers from a recession, it does not usually revert back to its exact earlier shape. Instead, the internal structure of the economy evolves and changes and this process can take time. For example, much of the economic growth of the mid-2000s was in the sectors of construction (especially of housing) and finance. However, when housing prices started falling in 2007 and the resulting financial crunch led into recession, both sectors contracted. The manufacturing sector of the U.S. economy has been losing jobs in recent years as well, under pressure from technological change and foreign competition. Many of the people thrown out of work from these sectors in the Great Recession of 2008–2009 will never return to the same jobs in the same sectors of the economy; instead, the economy will need to grow in new and different directions, as the following feature demonstrates. Fiscal policy can increase overall demand, but the process of structural economic change—the expansion of a new set of industries and the movement of workers to those industries—inevitably takes time.

Try It

People can lose jobs for a variety of reasons: because of a recession, but also because of longer-run changes in the economy, such as new technology. Productivity improvements in auto manufacturing, for example, can reduce the number of workers needed, and eliminate these jobs in the long run. The Internet has created jobs but also caused the loss of jobs as well, from travel agents to book store clerks. Many of these jobs may never come back. Short-run fiscal policy to reduce unemployment can create jobs, but it cannot replace jobs that will never return.

The Limitations of Policy

Fiscal and monetary policy can help an economy that is producing below its potential GDP to expand aggregate demand so that it produces closer to potential GDP, thus lowering unemployment. But policy cannot help an economy produce at an output level above potential GDP without causing inflation. At this point, unemployment becomes so low that workers become scarce and wages rise rapidly.

Political Realities and Discretionary Fiscal Policy

A final problem for discretionary fiscal policy arises out of the difficulties of explaining to politicians how countercyclical fiscal policy that runs against the tide of the business cycle should work. Politicians often have a gut-level belief that when the economy and tax revenues slow down, it is time to hunker down, pinch pennies, and trim expenses. Countercyclical policy, however, says that when the economy has slowed down, it is time for the government to raise spending and cut taxes to offset spending declines in the other sectors of economy. Conversely, when economic times are good and tax revenues are rolling in, politicians often feel that it is time for tax cuts and new spending. But countercyclical policy says that this economic boom should be an appropriate time for keeping taxes high and restraining spending.

Politicians tend to prefer expansionary fiscal policy over contractionary policy. There is rarely a shortage of proposals for tax cuts and spending increases, especially during recessions. However, politicians are less willing to hear the message that in good economic times, they should propose tax increases and spending limits. In the economic upswing of the late 1990s and early 2000s, for example, the U.S. GDP grew rapidly. Estimates from respected government economic forecasters like the nonpartisan Congressional Budget Office and the Office of Management and Budget stated that the GDP was above potential GDP, and that unemployment rates were unsustainably low. However, no mainstream politician took the lead in saying that the booming economic times might be an appropriate time for spending cuts or tax increases.

Note that because the Fed is insulated from the political process, it is more willing to use contractionary policy when the economy is booming and inflation threatens to increase.

Discretionary Fiscal & Monetary Policy: Summing Up

Expansionary fiscal and monetary policy can help to end recessions and contractionary fiscal policy can help to reduce inflation. Given the uncertainties over interest rate effects, time lags, temporary and permanent policies, and unpredictable political behavior, many economists and knowledgeable policymakers had concluded by the mid-1990s that discretionary fiscal policy was a blunt instrument, more like a club than a scalpel. It might still make sense to use it in extreme economic situations, like an especially deep or long recession. For less extreme situations, it was often preferable to let fiscal policy work through the automatic stabilizers and focus on monetary policy to steer short-term countercyclical efforts.

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Learning Objectives

[glossary-page][glossary-term]decision (or legislative) lag:[/glossary-term]
[glossary-definition] time necessary for the government or central bank to determine the appropriate policy response[/glossary-definition][glossary-term]impact (or effectiveness) lag: [/glossary-term]
[glossary-definition] time required for a new policy to have an impact on the economy[/glossary-definition][glossary-

term]implementation (or transmission) lag: [/glossary-term][glossary-definition] time necessary to execute the new policy change[/glossary-definition][glossary-term]legislative lag: [/glossary-term]
[glossary-definition]see decision lag[/glossary-definition][glossary-term]recognition (or data) lag:[/glossary-term]
[glossary-definition] time required to collect data and identify a problem from it[/glossary-definition]
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14.13: Policy Implications- Dampening Business Cycles vs. Laissez-Faire

Learning Objectives

- Compare and contrast Keynesian and Neoclassical policy responses to business cycles

Policy Responses to Business Cycles

In this course, we've focused on three goals for macroeconomics: full employment, stable prices (low inflation), and economic growth. We know that the economy tends to growth over time as a result of increases in the quantity and quality of labor and capital and improvements in technology. We also know that the path of the economy can be disturbed by shocks to aggregate demand or aggregate supply. We have learned about the limits to fiscal and monetary policy in the real world. Taking those into account, what policies would Keynesian and Neoclassical economists be likely to propose to promote those goals? That is the subject of this section.

Recall that neoclassical economists are predisposed towards market outcomes and are suspicious of using aggregate demand to manage the economy. By contrast, Keynesian economists are suspicious of market outcomes and lean towards demand management policies, both fiscal and monetary policy to try to improve market outcomes.

Let's take another look at business cycles. As explained earlier in the module on Macroeconomic Measures, unemployment can be divided into two categories: cyclical unemployment and the natural rate of unemployment, which is the sum of frictional and structural unemployment. Cyclical unemployment results from fluctuations in the business cycle and is created when the economy is producing below potential GDP—giving potential employers less incentive to hire, since there is less demand for their products. When the economy is producing at potential GDP, cyclical unemployment will be zero.

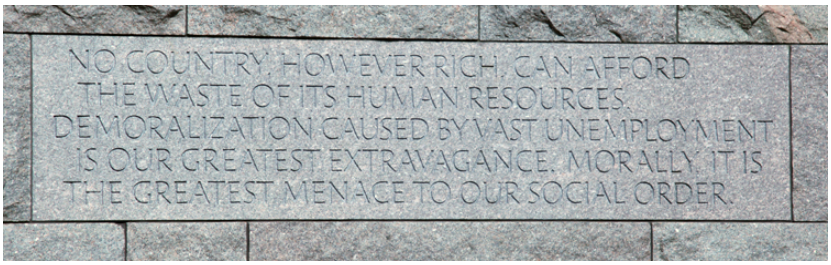


Figure 1.The Franklin D. Roosevelt Memorial in Washington D.C. This memorial quotes a portion of FDR's radio "fireside chat" during the Great Depression in September 1934. "No country, however rice, can afford the waste of its human resources."

Because of the dynamics of the labor market, in which people are always entering or exiting the labor force, the unemployment rate never falls to 0%, not even when the economy is producing at or even slightly above potential GDP. Due to imperfect information, it takes time for job seekers and employers to find each other. This search time causes frictional unemployment and is socially efficient when it puts people in the right jobs for them. Probably the best we can hope for is for the number of job vacancies to equal the number of job seekers.

Most economists do not consider frictional unemployment to be a "bad" thing. After all, there will always be workers who are unemployed while looking for a job that is a better match for their skills. There will always be employers that have an open position, while looking for a worker that is a better match for the job. Ideally, these matches happen quickly, but even when the economy is very strong there will be some frictional unemployment. Structural unemployment, where job seekers lack marketable skills, is a more serious matter, requiring deliberate policies to address.

Keynesian Perspective on Business Cycles

A decrease in aggregate demand causes a recessionary gap with increased unemployment. The question is what to do about it. If the economy is self-correcting, the unemployment and lack of sales will, over time, cause wages and prices to fall. shifting the AS curve to the right and returning the economy to full employment and potential GDP. Keynesian economists worry about the loss of jobs and income that may persist over time. For this reason, their preference is to stimulate aggregate demand to speed up the recovery and get people back to work. Additionally, Keynesians prefer increases in government spending to tax cuts. The former lead directly to increased aggregate demand, while the latter can be less effective if individuals and businesses don't spend all of their tax cuts. The deeper the recession, the more resources are unemployed and the less crowding out will result from expansionary fiscal policy. So Keynesians believe it makes sense to try to reduce the depth and duration of recessions.

Similarly, Keynesians argue for contractionary fiscal and monetary policy to offset an inflationary gap. As we explained in the Macroeconomic Measures module, inflation has both distributional and real costs as well. Keynesians hope a more active policy will reduce those social costs.

Both of these scenarios are shown in Figure 2 below.

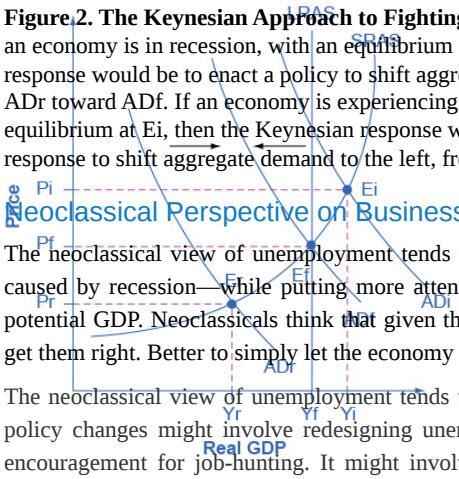


Figure 2. The Keynesian Approach to Fighting Recession and Inflation. If an economy is in recession, with an equilibrium at Er, then the Keynesian response would be to enact a policy to shift aggregate demand to the right from ADr toward ADf. If an economy is experiencing inflationary pressures with an equilibrium at Ei, then the Keynesian response would be to enact a policy response to shift aggregate demand to the left, from ADi toward ADf.

Neoclassical Perspective on Business Cycles

The neoclassical view of unemployment tends to focus attention away from the problem of cyclical unemployment—that is, unemployment caused by recession—while putting more attention on the issue of the unemployment that prevails even when the economy is operating at potential GDP. Neoclassicals think that given the real world complications of fiscal and monetary policy discussed above, it is too difficult to get them right. Better to simply let the economy adjust back to potential output on its own.

The neoclassical view of unemployment tends to focus on how public policy can be used to reduce the natural rate of unemployment. Such policy changes might involve redesigning unemployment and welfare programs so that they support those in need, but also offer greater encouragement for job-hunting. It might involve redesigning business rules with an eye to whether they are unintentionally discouraging businesses from taking on new employees. It might involve building institutions to improve the flow of information about jobs and the mobility of workers, to help bring workers and employers together more quickly. For those workers who find that their skills are permanently no longer in demand (for example, the structurally unemployed), policy can provide opportunities for retraining so that these workers can reenter the labor force and seek employment. Note that Keynesian economists also support improved labor market functioning and retraining for the structurally unemployed.

Neoclassical economists will not tend to see aggregate demand as a useful tool for reducing unemployment; after all, if economic output is at or near potential, then aggregate demand has no significant effect on unemployment. This is shown by the vertical aggregate supply curve. Instead, neoclassical economists believe that aggregate demand should be allowed to expand only to match the gradual shifts of aggregate supply to the right—keeping the price level much the same and inflationary pressures low. That's a job for monetary policy, with the supply of money growing at a stable rate, say the Neoclassicals.

If aggregate demand rises rapidly in the neoclassical model, in the long run it leads only to inflationary pressures. Figure 3 shows a vertical long-run AS curve and three different levels of aggregate demand, rising from AD_0 to AD_1 to AD_2. As the macroeconomic equilibrium rises from E_0 to E_1 to E_2, the price level rises, but real GDP does not budge; nor does the rate of unemployment, which adjusts to its natural rate. Conversely, reducing inflation has no long-term costs, either. Think about Figure 2 in reverse, as the aggregate demand curve shifts from AD_2 to AD_1 to AD_0, and the equilibrium moves from E_2 to E_1 to E_0. During this process, the price level falls, but, in the long run, neither real GDP nor the natural rate of unemployment is changed.

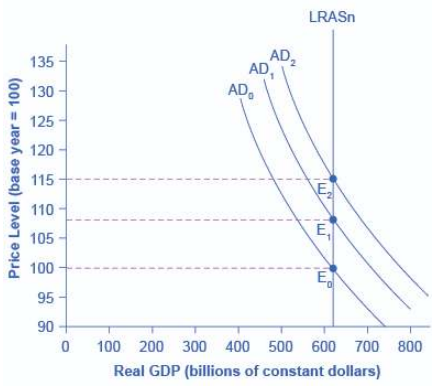


Figure 3. How Aggregate Demand Determines the Price Level in the Long Run. As aggregate demand shifts to the right, from AD_0 to AD_1 to AD_2, real GDP in this economy and the level of unemployment do not change. However, there is inflationary pressure for a higher price level as theequilibrium changes from E_0 to E_1 to E_2.

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Try It

The recessions of 1990 and 2001 were each so short that had the government attempted fiscal or monetary stimulus, the economy would have been already recovering when the stimulus kicked in, creating an inflationary boom. Neoclassical policies would have been the right call.

During the recession of 1982-83, however, letting the economy fix itself would have made a long and deep recession even worse. This recession was caused by a serious monetary contraction, which successfully wrung inflation out of the system. Inflation has been under control in the U.S. since then. In the early 1980s, the Reagan administration conducted a series of significant tax cuts over the period 1981-83. This was followed by an increase in defense spending which raised overall Federal spending. While the purpose of this fiscal expansion was ideological, rather than to counter the recession, the effects did in fact do so, leading to the longest peacetime expansion in modern U.S. history. Monetary policy was also accommodating during this time.

The Obama administration's response to the Great Recession (2007-2009), as we have noted before, was explicitly expansionary. The consensus of most macroeconomists is that fiscal and monetary stimulus helped end the recession; indeed, some argue the stimulus should have been greater.

Summary of Neoclassical Economics versus Keynesian Economics

Table 1 summarizes the key differences between the two schools of thought.

Table 1. Neoclassical versus Keynesian Economics

	Keynesian Economics	Neoclassical Economics
Focus: long-term or short term	Short-term	Long-term
Economic output: Primarily determined by aggregate demand or aggregate supply?	Aggregate demand	Aggregate supply
Prices and wages: sticky or flexible?	Sticky in the short run; flexible in the long run	Always flexible
Aggregate supply: vertical or upward-sloping?	Upward-sloping	Vertical
Long-run aggregate supply	Long Run Aggregate Supply (LRAS) is vertical. According to the Keynesians, an increase in aggregate demand (faster than growth in LRAS), will just cause inflation and will not increase real GDP.	Long Run Aggregate Supply (LRAS) is vertical. According to neoclassicals, an increase in aggregate demand (faster than growth in LRAS), will just cause inflation and will not increase real GDP. Neoclassicals differ from Keynesians by also thinking that AS is inelastic in the short run.
Phillips curve vertical or downward-sloping	Downward sloping; there is a trade-off between unemployment and inflation, at least in the short run.	Vertical; there is no trade-off in the long run, and there may not be in the short run.
Views on crowding out	No crowding out during a recession.	Government borrowing when the economy is at potential GDP results in complete crowding out.
What should be the primary area of policy emphasis for reducing unemployment?	Increase aggregate demand to eliminate cyclical unemployment.	Reform labor market institutions to reduce frictional unemployment and the natural rate of unemployment.
Is aggregate demand a useful tool for controlling inflation?	Yes	Yes
Is aggregate demand a useful tool for ending recession?	Yes	Unlikely. At best, only in the short-run temporary sense, but may just increase inflation instead
Policy implications in the short run	Keynesians believe fiscal and monetary policy should be used actively in the short run to manage aggregate demand.	Neoclassicals believe that the economy is self-correcting, and attempting to fine-tune the economy through monetary and fiscal policies, due to long and variable policy lags, makes problems worse and not better.
Policy implications in the long run	Keynesians believe fiscal policy in the long run should be devoted to increasing potential GDP. Tax cuts on business investment can help, as well as investing in public infrastructure.	Neoclassicals believe fiscal policy (primarily in the form of tax cuts) should be devoted to increasing potential GDP through physical and human capital.

Try It

These questions allow you to get as much practice as you need, as you can click the link at the top of the first question ("Try another version of these questions") to get a new set of questions. Practice until you feel comfortable doing the questions.

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14.14: Policy Implications- Supply Shocks and Economic Growth

Learning Objectives

- Explain why there is no good policy response to a negative aggregate supply shock
- Differentiate between the fiscal and monetary policies a neoclassical economist would recommend to promote economic growth and those a Keynesian economist would recommend

Responding to Real Shocks to the Economy

Changes in aggregate demand always result in unemployment going one way, while inflation goes the other, at least in the short run. We saw this on the previous page, where a decrease in AD caused an increase in unemployment, but a decrease in the price level, and an increase in AD caused the opposite.

Changes in aggregate supply push inflation and unemployment in the same direction at the same time. If the shock is positive, shifting AS to the right, this is very, very good since both inflation and unemployment fall. But if the shock is negative, shifting AS to the left, the output is not good since both inflation and unemployment rise. This is stagflation, which happened during the 1970s. In the latter case, there is no good policy option since an expansionary fiscal or monetary policy while lowering unemployment would make inflation worse. A contractionary fiscal or monetary policy could reduce inflation, but cause greater unemployment.

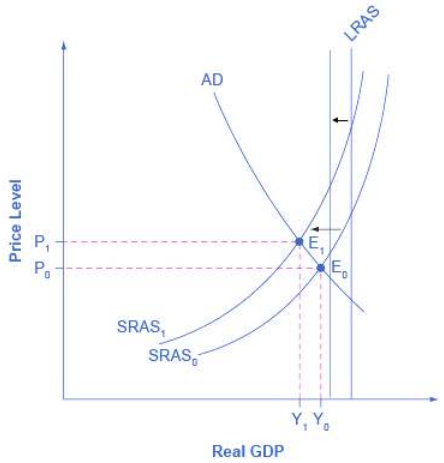


Figure 1. Effects of a Negative Supply Shock.

Figure 1 illustrates the effects of a rapid increase in the price of oil. This negative real shock would cause the LRAS to shift to the left, which causes not only a decrease in GDP, but an increase in inflation. These two issues (recession and high inflation) typically require opposite policies from the Fed.

To decrease inflation, the Fed could decrease the money supply and reduce aggregate demand, but that would only make the recession deeper. Or they could increase real output by decreasing interest rates, stimulating aggregate demand, but that would likely cause even higher inflation. This is precisely why there is no easy answer to this situation.

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Try It

Negative real shocks are more complicated than shocks to aggregate demand. A real-life example of this occurred in the 1970s. The recession of 1974-75 was caused by adverse supply shocks, primarily the Oil Crisis which occurred when the Arab members of the Organization of Petroleum Exporting Countries (OPEC) embargoed petroleum exports, driving up the price of oil. Since oil is used in the manufacturing of most goods and services, this was a very large supply shock. This recession was, at the time, the worst economic downturn since the Great Depression.

The Federal Funds Rate peaked in mid-1975 as the Fed aggressively cut interest rates to stimulate aggregate demand and reduce unemployment. The Ford Administration conducted an expansionary fiscal policy, driven largely by tax cuts, which you would expect from a Republican (and thus neoclassical) administration. The economy recovered, but inflation went even higher, peaking at nearly 14% in mid-1980.

Watch It

Watch the clip from this video to better understand what happened with stagflation during the 1970s economic crisis, as well as the policies taken by the Fed to put an end to rising inflation.

A link to an interactive elements can be found at the bottom of this page.

Fighting Recession or Encouraging Long-Term Growth?

Neoclassical economists believe that the economy will rebound out of a recession or eventually contract during an expansion because prices and wage rates are flexible and will adjust either upward or downward to restore the economy to its potential GDP. Ironically, the Ford Administration's aggressive fiscal stimulus policy was perhaps not what you would expect; but sometimes politics overrides theory. Thus, the key policy question for neoclassicals is how to promote growth of potential GDP.

We know that economic growth ultimately depends on the growth rate of long-term productivity. Productivity measures how effective inputs are at producing outputs. We know that U.S. productivity has grown on average about 2% per year. That means that the same amount of inputs produce 2% more output than the year before. We also know that productivity growth varies a great deal in the short term due to cyclical factors. It also varies somewhat in the long term. From 1953–1972, U.S. labor productivity (as measured by output per hour in the business sector) grew at 3.2% per year. From 1973–1992, productivity growth declined significantly to 1.8% per year.hen, from 1993–2014, productivity growth increased slightly to 2% per year. The neoclassical economists believe the underpinnings of long-run productivity growth to be an economy's investment in human capital, physical capital, and technology, operating together in a market-oriented environment that rewards innovation. Promotion of these factors is what government policy should focus on.

Keynesian economists also support policies to promote economic growth, but not to the exclusion of countercyclical policies–those that try to diminish the fluctuations of business cycles.

Policy in Practice

Most Republican administrations favor tax cuts to promote economic growth. We saw this with the Ford administration, but it was also a large motivation for the Reagan tax cuts. Democratic administrations are more likely to support increases in government spending on education and infrastructure investment.

The economic boom of the 1990s was driven by private investment as the Internet became increasingly available. Credit should also go to public investment in research and development (R&D) that started in the late-1970s and 1980s. The decline in public R&D spending during the1990s probably contributed to the less impressive economic performance of the 2000s. While the Clinton Administration failed to achieve its health care reform goals, it did manage to boost the Head Start program, which provides preschool for low income children. Fiscal policy was also moderately contractionary as budget deficits became budget surpluses, in part as an attempt to reduce the likelihood of crowding out which would limit private investment and future economic growth.

Summary of Macroeconomic Policy Recommendations

Keynesian economists believe that the costs of allowing the economy to recover from recessionary and inflationary gaps are too high, that it's preferable to actively manage the economy. By contrast, Neoclassical economists do not believe in "fine-tuning" the economy. Neoclassicals prefer to focus policy on economic growth. They think that economic growth is fostered by a stable economic environment with a low rate of inflation. Similarly, tax rates should be low and unchanging. In this environment, private economic agents can make the best possible investment decisions, which will lead to optimal investment in physical and human capital as well as research and development to promote improvements in technology. Keynesians also believe in promoting economic growth, but they favor government investment in infrastructure, a form of government spending, as well as both direct

spending and tax cuts to promote research and development, and spending on human capital, that is education, both K12 and higher education.

Try It

https://assessments.lumenlearning.co...sessments/7673
https://assessments.lumenlearning.co...sessments/7674

watch it

This video nicely reviews the main approaches to macroeconomic policies and considers the various fiscal and monetary tools economists could use to counteract a recession or an inflationary gap. Looking at recession first, see if you can answer the following questions:

a. What will happen to wages, costs, and aggregate supply if no policy is implemented?

[reveal-answer q="740624"]Show Answer[/reveal-answer]
[hidden-answer a="740624"] Wages will decrease, costs will decrease, and aggregate supply will eventually shift to the right in the long run.[/hidden-answer]

b. How could fiscal policy be used to combat the recession?

[reveal-answer q="160427"]Show Answer[/reveal-answer]
[hidden-answer a="160427"]Government spending could increase, causing aggregate demand to increase OR a tax cut could result in more disposable income, which would increase consumption, and cause a shift to the right in the AD curve.[/hidden-answer]

c. How could monetary policy be used to combat the recession?[reveal-answer q="937624"]Show Answer[/reveal-answer]
[hidden-answer a="937624"]The Fed can increase the money supply, which would decrease interest rates and increase investment and consumption, which will increase AD and shift the AD curve to the right.[/hidden-answer]

d. How would the Fed change the reserve requirement to combat a recession?[reveal-answer q="884527"]Show Answer[/reveal-answer]
[hidden-answer a="884527"]The Fed would lower the reserve requirement, allowing banks to create more money.[/hidden-answer]

e. How would the Fed change the discount rate to combat a recession?

[reveal-answer q="985940"]Show Answer[/reveal-answer]
[hidden-answer a="985940"]The Fed would lower the discount rate and loan out more money to banks.[/hidden-answer]

f. How would the Fed use open market operations to combat a recession?

[reveal-answer q="690009"]Show Answer[/reveal-answer]
[hidden-answer a="690009"]The Fed could sell bonds, putting money into the money supply.[/hidden-answer]

A link to an interactive elements can be found at the bottom of this page.

Now consider these exact same questions, but apply them to an *inflationary gap*.

a. What will happen to wages, costs, and aggregate supply if no policy is implemented?

[reveal-answer q="175956"]Show Answer[/reveal-answer]
[hidden-answer a="175956"]Wages will increase, costs will increase, and aggregate supply will eventually shift to the left in the long run.[/hidden-answer]

b. How could fiscal policy be used to combat inflation?

[reveal-answer q=”517496″]Show Answer[/reveal-answer]
[hidden-answer a=”517496″]Government spending could decrease, causing aggregate demand to decrease OR a tax hike could result in less disposable income, less consumption, and cause a shift to the left in the AD curve.[/hidden-answer]

c. How could monetary policy be used to combat inflation?

[reveal-answer q=”415471″]Show Answer[/reveal-answer]
[hidden-answer a=”415471″]]The Fed can decrease the money supply, which would increase interest rates and lower investment and consumption, which will lower AD and shift the AD curve to the left.[/hidden-answer]

d. How would the Fed change the reserve requirement to combat inflation?

[reveal-answer q=”391002″]Show Answer[/reveal-answer]
[hidden-answer a=”391002″]The Fed would raise the reserve requirement.[/hidden-answer]

e. How would the Fed change the discount rate to combat inflation?

[reveal-answer q=”281871″]Show Answer[/reveal-answer]
[hidden-answer a=”281871″]The Fed would raise the discount rate.[/hidden-answer]

f. How would the Fed use open market operations to combat a recession?

[reveal-answer q=”345776″]Show Answer[/reveal-answer]
[hidden-answer a=”345776″]The Fed could sell bonds.[/hidden-answer]

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14.15: Putting It Together- Policy Application

The goal of this module was to give you an understanding of the strengths and weakness of fiscal and monetary policy to determine an appropriate stabilization policy for a given macroeconomic situation.

You learned how to:

- Explain the Keynesian approach to a given macro problem, and how they would respond to criticisms of their approach.
- Explain the Neoclassical approach to the same problem, and how they would respond to criticisms of their approach.
- Incorporate both policy approaches to synthesize a reasonable response to a specific real world problem.

watch It

Watch these two videos to see contrasting opinions about what factors led to the financial crisis in 2007 and 2008. Consider both the Keynesian and neoclassical (explained as Hayek in the video) perspectives that you learned about in this module and analyze what changes might have been made to avoid the financial crash in 2007.

A link to an interactive elements can be found at the bottom of this page.

A link to an interactive elements can be found at the bottom of this page.

The real world is complicated. Both Keynesian and Neoclassical economist have insights to offer. Citizens expect government to "fix" problems in the macroeconomy, but the tools the government has to work with are somewhat blunt rather than precise instruments. Economists have a better sense of how to nudge the trajectory of the economy over the long term, than to accurately offset every short term up and down the economy experiences. This means that while government has some ability to address macro difficulties, it needs to be sure it does more good than harm.

The Fed has done a respectable job of controlling inflation over the last 30 years. We should continue to allow them to do that. fiscal policy is probably not a good tool to address a small recession, especially given the lags involved. Monetary policy could be loosened a bit, but sometimes the economy is better left to its own devices because government policy lacks precision. But in the case of a major downturn, like the Great Recession, it makes sense to use fiscal policy to help the economy recover and get people back to work. Even with lags, fiscal policy will likely help when it's needed.

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14.16: Discussion- Macropolicy

Respond to the following prompt in a post with a minimum of 250 words, then comment on at least TWO other posts.

- In this module we learned about a number of real world complications that make monetary and fiscal policy more challenging than simple theory would suggest. Given the state of the economy and the causes of that state—think back to earlier discussions about the current economy—what should be the appropriate mix of fiscal and monetary policy, from a Keynesian perspective? From a neoclassical perspective? Which makes the most sense to you? Provide evidence (include and least one link/citation) to provide support to your conclusion.

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14.17: Assignment- Policy Response to a Macro Shock

The Great Recession was the most serious economic downturn in U.S. history since the Great Depression. The recession began in December 2007. Interest rates at the time were very low, close to zero. Despite the American Recovery and Reinvestment Act of 2009, a nearly $800 billion fiscal stimulus and an expansionary monetary policy, the economy is only now getting back to normal in 2015.

In retrospect, what set of macro policies, if anything, should we have conducted to achieve a better recovery? Show using the AD/AS model and explain your reasoning.

Rubric

Criteria	Not Evident	Developing	Proficient	Distinguished	Weight
Create a graphic to illustrate the recession using the AD/AS model					6
Explain why monetary policy is unlikely to work					6
Explain why fiscal policy is likely to work well in this scenario					6
Articulation of response (citations, grammar, spelling, syntax, or organization that negatively impact readability and articulation of main ideas.)					2
					Total: 20

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14.18: Assignment- Problem Set — Policy Applications

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- Policy Applications Problem Set

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CHAPTER OVERVIEW

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15.1: Why It Matters- Globalization and International Trade

Why analyze the benefits and costs of international trade?



Over time, the world has become a smaller place. Globalization is the process by which the world, previously isolated through physical and technological distance, becomes increasingly interconnected. Globalization happens through the increase in interaction between peoples around the world that involves the sharing of ideas, cultures, goods, services and investment. The last sixty years have witnessed a huge increase in globalization, but the phenomenon has been going on for much longer. Thomas Friedman describes the current trend as the third great wave of globalization in human history.

As globalization increases over time, individuals, firms, institutions, and politicians work within and across countries to define exactly how “open” they want to be. It is natural for people to want to protect their own products through tariffs or trade restrictions, while having open access to foreign markets. But if one country protects its products, its trading partners are likely to do the same. One thing is for sure, protection and openness to international trade both have income distribution effects. The key question is who reaps the benefits and who carries the burden of the system adopted by a given country.

This module may be more important than you think. The topic is international trade and includes aspects of globalization and finance, but the theory explains every transaction we conduct. Why do people work for pay instead of growing their own food, building their own house and making their own clothes? Most people are capable of painting their own homes, yet professional painters continue to make a good living. How is international trade different from domestic trade? The answer is, “not very much, only in the details.” People buy imported goods for the same reasons they buy domestic goods. And yet we often treat foreign and domestic trade as fundamentally different. A grocery chain from a nearby state has recently opened some stores in your neighborhood. How would you feel if the local government prohibited you from shopping at those new stores?

In this module, you will learn that just as buying from the local grocery store is better for most people than growing your own food, so international trade can add to your convenience and quality of life. And yet, most countries support some degree of protectionism, barriers to trade like tariffs, or quotas designed to “protect” domestic workers and companies.

As you proceed through this module, consider the following questions:

- What is comparative advantage?
- What are the gains from international trade?
- In what sense do barriers to trade protect American workers and companies?
- What are the costs of globalization? Are the costs worth it?

International trade and finance are often confused as being synonymous with globalization. Indeed, trade and international finance have contributed to globalization but they are not the same. Globalization is a process that widens, deepens and speeds-up interconnectedness between people, institutions, markets and nations. Trade and finance are two arteries through which the process of globalization flows. There are many ways to conceptualize globalization.

Try It

The iPhone is a global product. Apple does not manufacture the iPhone components, nor does it assemble them. The assembly is done by Foxconn Corporation, a Taiwanese company, at its factory in Sengzhen, China. But, Samsung, the electronics firm and competitor to Apple, actually supplies many of the parts that make up an iPhone—about 26%. That means, that Samsung is both the biggest supplier and biggest competitor for Apple. Why do these two firms work together to produce the iPhone?



Figure 1. Apple or Samsung iPhone? While the iPhone is readily recognized as an Apple product, 26% of the component costs in it come from components made by rival phone-maker, Samsung. In international trade, there are often "conflicts" like this as each country or company focuses on what it does best. (Credit: modification of work by Yutaka Tsutano Creative Commons)

To understand the economic logic behind international trade, you have to accept, as these firms do, that trade is about mutually beneficial exchange. Samsung is one of the world's largest electronics parts suppliers. Apple lets Samsung focus on making the best parts, which allows Apple to concentrate on its strength—designing elegant products that are easy to use. If each company (and by extension each country) focuses on what it does best, there will be gains for all through trade.

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15.2: Introduction to Comparative Advantage

What you'll learn to do: define and calculate comparative advantage, and understand how countries choose which goods and services to trade internationally



People trade for goods and services if they can buy them more cheaply than they could make them themselves. This is true whether you're buying produce from the grocery store or imported chocolate from another country.

We live in a global marketplace. The food on your table might include fresh fruit from Chile, cheese from France, and bottled water from Scotland. Your wireless phone might have been made in Taiwan or Korea. The clothes you wear might be designed in Italy and manufactured in China. The toys you give to a child might have come from India. The car you drive might come from Japan, Germany, or Korea. The gasoline in the tank might be refined from crude oil from Saudi Arabia, Mexico, or Nigeria. As a worker, if your job is involved with farming, machinery, airplanes, cars, scientific instruments, or many other technology-related industries, the odds are good that a hearty proportion of the sales of your employer—and hence the money that pays your salary—comes from export sales. We are all linked by international trade, and the volume of that trade has grown dramatically in the last few decades.

In this section, you will learn about the basics behind international trade, what determines the costs of imports and exports, and why it is advantageous for countries to specialize in the production of particular goods or services.

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15.3: Absolute and Comparative Advantage

Learning Objectives

- Explain absolute advantage and comparative advantage

Absolute and Comparative Advantage

The American statesman Benjamin Franklin (1706–1790) once wrote: “No nation was ever ruined by trade.” Many economists would express their attitudes toward international trade in an even more positive manner. The evidence that international trade confers overall benefits on economies is pretty strong. Trade has accompanied economic growth in the United States and around the world. Many of the national economies that have shown the most rapid growth in the last few decades—for example, Japan, South Korea, China, and India—have done so by dramatically orienting their economies toward international trade. There is no modern example of a country that has shut itself off from world trade and yet prospered. To understand the benefits of trade, or why we trade in the first place, we need to understand the concepts of comparative and absolute advantage.

In 1817, David Ricardo, a businessman, economist, and member of the British Parliament, wrote a treatise called *On the Principles of Political Economy and Taxation*. In this treatise, Ricardo argued that specialization and free trade benefit all trading partners, even those that may be relatively inefficient. To see what he meant, we must be able to distinguish between absolute and comparative advantage.

A country has an **absolute advantage** over another country if it can produce a given product using fewer resources than the other country needs to use. For example, if Canada can produce 100 pounds of beef using two ranchers, while Argentina needs three ranchers to produce 100 pounds of beef, Canada has an absolute advantage over Argentina in beef production.

Absolute advantage can be the result of a country’s natural endowment. For example, extracting oil in Saudi Arabia is pretty much just a matter of “drilling a hole.” Producing oil in other countries can require considerable exploration and costly technologies for drilling and extraction—if indeed they have any oil at all. The United States has some of the richest farmland in the world, making it easier to grow corn and wheat than in many other countries. Guatemala and Colombia have climates especially suited for growing coffee. Chile and Zambia have some of the world’s richest copper mines. As some have argued, “geography is destiny.” As a result, it should not be surprising if Chile provides copper to Guatemala, while Guatemala provides coffee to Chile. When each country has a product others need and it can be produced with fewer resources in one country over another, then it is easy to imagine all parties benefitting from trade. However, thinking about trade just in terms of geography and absolute advantage is incomplete. What happens if one country has an absolute advantage in both goods? Trade really occurs because of comparative advantage.

Try It

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A country has a **comparative advantage** when it can produce a good at a lower *opportunity cost* than another country. The question each country or company should be asking when it trades is this: “What do we give up to produce this good?” For example, if Zambia produces copper, the resources it uses cannot be used to produce other goods such as corn. As a result, Zambia gives up the opportunity to produce corn. Suppose it takes 10 hours of labor to mine a ton of copper in Zambia, and 20 hours of labor to harvest a bushel of corn. This means the opportunity cost of producing a ton of copper is 2 bushels of corn. The next section develops absolute and comparative advantage in greater detail and relates them to trade.

Try It

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Watch It

Watch the following video to better understand comparative advantage.

A link to an interactive elements can be found at the bottom of this page.

What Happens When a Country Has an Absolute Advantage in All Goods

What happens to the possibilities for trade if one country has an absolute advantage in everything? This is typical for high-income countries that often have well-educated workers, technologically advanced equipment, and the most up-to-date production processes. These high-income countries can produce all products with fewer resources than a low-income country. If the high-income country is more productive across the board, will there still be gains from trade? Good students of Ricardo understand that trade is about mutually beneficial exchange. Even when one country has an absolute advantage in all products, trade can still benefit both sides. This is because gains from trade come from specializing in one's comparative advantage.

Learning Objectives

[glossary-page][glossary-term]absolute advantage: [/glossary-term]
[glossary-definition]when one country can use fewer resources to produce a good compared to another country; when a country is more productive compared to another country[/glossary-definition]
[glossary-term]comparative advantage: [/glossary-term]
[glossary-definition]when a country can produce a good at a lower cost in terms of other goods; or, when a country has a lower opportunity cost of production[/glossary-definition]
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15.4: Comparative Advantage and the Gains from Trade

Learning Objectives

- Calculate absolute and comparative advantage

Production Possibilities and Comparative Advantage

Consider the example of trade in two goods, shoes and refrigerators, between the United States and Mexico. These goods are homogeneous, meaning that consumers and producers cannot differentiate between shoes from Mexico and shoes from the U.S.; nor can they differentiate between Mexican or American refrigerators.

From Table 1, we can see that it takes four U.S. workers to produce 1,000 pairs of shoes, but it takes five Mexican workers to do so. It takes one U.S. worker to produce 1,000 refrigerators, but it takes four Mexican workers to do so. The United States has an absolute advantage in producing both shoes and refrigerators; that is, it takes fewer workers in the United States than in Mexico to produce both a given number of shoes and a given number of refrigerators.

Table 1. Resources Needed to Produce Shoes and Refrigerators

Country	Number of Workers needed to produce 1,000 units — Shoes	Number of Workers needed to produce 1,000 units — Refrigerators
United States	4 workers	1 worker
Mexico	5 workers	4 workers

Absolute advantage simply compares the *productivity* of a worker between countries. It answers the question, "How many inputs do I need to produce shoes in Mexico?" Comparative advantage asks this same question slightly differently. Instead of comparing how many workers it takes to produce a good, it asks, "How much am I giving up to produce this good in this country?" Another way of looking at this is that comparative advantage identifies the good for which the producer's absolute advantage is relatively larger, or where the producer's absolute productivity disadvantage is relatively smaller. The United States can produce 1,000 shoes with four-fifths as many workers as Mexico (four versus five), but it can produce 1,000 refrigerators with only one-quarter as many workers (one versus four). So, the comparative advantage of the United States, where its absolute productivity advantage is relatively greatest, lies with refrigerators, and Mexico's comparative advantage, where its absolute productivity disadvantage is least, is in the production of shoes.

Mutually Beneficial Trade with Comparative Advantage

When nations increase production in their area of comparative advantage and trade with each other, both countries can benefit. The production possibilities frontier is a useful tool to visualize this benefit. Recall from earlier readings that the production possibilities frontier shows the maximum amount that each country can produce given its limited resources, in this case workers.

Consider a situation where the United States and Mexico each have 40 workers. For example, as Table 2 shows, if the United States divides its labor so that 40 workers are making shoes, then, since it takes four workers in the United States to make 1,000 shoes, a total of 10,000 shoes will be produced. (If four workers can make 1,000 shoes, then 40 workers will make 10,000 shoes). If the 40 workers in the United States are making refrigerators, and each worker can produce 1,000 refrigerators, then a total of 40,000 refrigerators will be produced.

Table 2. Production Possibilities before Trade

Country	Shoe Production — using 40 workers		Refrigerator Production — using 40 workers
United States	10,000 shoes	or	40,000 refrigerators
Mexico	8,000 shoes	or	10,000 refrigerators

As always, the slope of the production possibility frontier for each country is the opportunity cost of one refrigerator in terms of foregone shoe production–when labor is transferred from producing the latter to producing the former (see Figure 1).

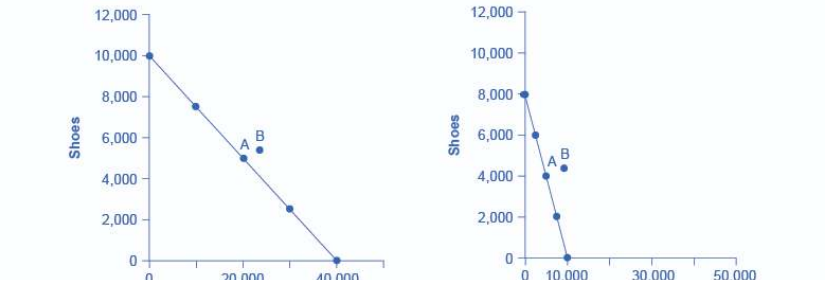


Figure 1.Production Possibility Frontiers. (a) With 40 workers, the United States can produce either 10,000 shoes and zero refrigerators or 40,000 refrigerators and zero shoes. (b) With 40 workers, Mexico can produce a maximum of 8,000 shoes and zero refrigerators, or 10,000 refrigerators and zero shoes. All other points on the production possibility line are possible combinations of the two goods that can be produced given current resources. Point A on both graphs is where the countries start producing and consuming before trade. Point B is where they end up after trade.

Let's say that, in the situation before trade, each nation prefers to produce a combination of shoes and refrigerators that is shown at point A. Table 3 shows the output of each good for each country and the total output for the two countries.

Table 3. Production at Point A before Trade

Country	Current Shoe Production	Current Refrigerator Production
United States	5,000	20,000
Mexico	4,000	5,000
Total	**9,000**	**25,000**

Continuing with this scenario, each country transfers some amount of labor toward its area of comparative advantage. For example, the United States transfers six workers away from shoes and toward producing refrigerators. As a result, U.S. production of shoes decreases by 1,500 units (6/4 × 1,000), while its production of refrigerators increases by 6,000 (that is, 6/1 × 1,000). Mexico also moves production toward its area of comparative advantage, transferring 10 workers away from refrigerators and toward production of shoes. As a result, production of refrigerators in Mexico falls by 2,500 (10/4 × 1,000), but production of shoes increases by 2,000 pairs (10/5 × 1,000). Notice that when both countries shift production toward each of their comparative advantages (what they are relatively better at), their combined production of both goods rises, as shown in Table 4. The reduction of shoe production by 1,500 pairs in the United States is more than offset by the gain of 2,000 pairs of shoes in Mexico, while the reduction of 2,500 refrigerators in Mexico is more than offset by the additional 6,000 refrigerators produced in the United States.

Table 4. Shifting Production Toward Comparative Advantage Raises Total Output

Country	Shoe Production	Refrigerator Production
United States	3,500	26,000
Mexico	6,000	2,500
Total	**9,500**	**28,500**

This numerical example illustrates the remarkable insight of comparative advantage: even when one country has an absolute advantage in all goods and another country has an absolute disadvantage in all goods, both countries can still benefit from trade. Even though the United States has an absolute advantage in producing both refrigerators and shoes, it makes economic sense for it to specialize in the good for which it has a comparative advantage. The United States will export refrigerators and in return import shoes.

Try It

When you first met the production possibility frontier (PPF) in an earlier module, it was drawn with an outward-bending shape. This shape illustrated that as inputs were transferred from producing one good to another—like from education to health services—there were increasing opportunity costs. In the examples in this module, the PPFs are drawn as straight lines, which means that opportunity costs are constant. When a marginal unit of labor is transferred away from growing corn and toward producing oil, the decline in the quantity of corn and the increase in the quantity of oil is always the same. In reality this is possible only if the contribution of additional workers to output did not change as the scale of production changed. The linear production possibilities frontier is a less realistic model, but a straight line simplifies calculations. It also illustrates economic themes like absolute and comparative advantage just as clearly.

How Opportunity Cost Sets the Boundaries of Trade

This example shows that both parties can benefit from specializing in their comparative advantages and trading. By using the opportunity costs in this example, it is possible to identify the range of possible trades that would benefit each country.

Mexico started out, before specialization and trade, producing 4,000 pairs of shoes and 5,000 refrigerators. Then, in the numerical example given, Mexico shifted production toward its comparative advantage and produced 6,000 pairs of shoes but only 2,500 refrigerators. Thus, if Mexico can *export* no more than 2,000 pairs of shoes (giving up 2,000 pairs of shoes) in exchange for *imports* of at least 2,500 refrigerators (a gain of 2,500 refrigerators), it will be able to consume more of both goods than before trade. Mexico will be unambiguously better off. Conversely, the United States started off, before specialization and trade, producing 5,000 pairs of shoes and 20,000 refrigerators. In the example, it then shifted production toward its comparative advantage, producing only 3,500 shoes but 26,000 refrigerators. If the United States can export no more than 6,000

refrigerators in exchange for imports of at least 1,500 pairs of shoes, it will be able to consume more of both goods and will be unambiguously better off.

The range of trades that can benefit both nations is shown in Table 5. For example, a trade where the U.S. exports 4,000 refrigerators to Mexico in exchange for 1,800 pairs of shoes would benefit both sides, in the sense that both countries would be able to consume more of both goods than in a world without trade.

Table 5. The Range of Trades That Benefit Both the United States and Mexico

The U.S. economy, after specialization, will benefit if it:	The Mexican economy, after specialization, will benefit if it:
Exports fewer than 6,000 refrigerators	*Imports* at least 2,500 refrigerators
Imports at least 1,500 pairs of shoes	*Exports* no more than 2,000 pairs of shoes

Trade allows each country to take advantage of lower opportunity costs in the other country. If Mexico wants to produce more refrigerators without trade, it must face its domestic opportunity costs and reduce shoe production. If Mexico, instead, produces more shoes and then trades for refrigerators made in the United States, where the *opportunity cost* of producing refrigerators is lower, Mexico can in effect take advantage of the lower opportunity cost of refrigerators in the United States. Conversely, when the United States specializes in its comparative advantage of refrigerator production and trades for shoes produced in Mexico, international trade allows the United States to take advantage of the lower opportunity cost of shoe production in Mexico.

The theory of comparative advantage explains why countries trade: they have different comparative advantages. It shows that the gains from international trade result from pursuing comparative advantage and producing at a lower opportunity cost. The following feature shows how to calculate absolute and comparative advantage and the way to apply them to a country's production.

Calculating Absolute and Comparative Advantage

In Canada a worker can produce 20 barrels of oil or 40 tons of lumber. In Venezuela, a worker can produce 60 barrels of oil or 30 tons of lumber.

Table 6. Oil and Lumber Production in Canada and Venezuela

Country	Oil (barrels)		Lumber (tons)
Canada	20	or	40
Venezuela	60	or	30

1. Who has the absolute advantage in the production of oil or lumber? How can you tell?
2. Which country has a comparative advantage in the production of oil?
3. Which country has a comparative advantage in producing lumber?
4. In this example, is absolute advantage the same as comparative advantage, or not?
5. In what product should Canada specialize? In what product should Venezuela specialize?

Step 1. Make a table like Table 6.

Step 2. To calculate absolute advantage, look at the larger of the numbers for each product. One worker in Canada can produce more lumber (40 tons versus 30 tons), so Canada has the absolute advantage in lumber. One worker in Venezuela can produce 60 barrels of oil compared to a worker in Canada who can produce only 20.

Step 3. To calculate comparative advantage, find the opportunity cost of producing one barrel of oil in both countries. The country with the lowest opportunity cost has the comparative advantage. With the same labor time, Canada can produce either 20 barrels of oil or 40 tons of lumber.

So in effect, 20 barrels of oil is equivalent to 40 tons of lumber: 20 oil = 40 lumber. Divide both sides of the equation by 20 to calculate the opportunity cost of one barrel of oil in Canada. 20/20 oil = 40/20 lumber. 1 oil = 2 lumber. To produce one additional barrel of oil in Canada has an opportunity cost of 2 lumber.

Calculate the same way for Venezuela: 60 oil = 30 lumber. Divide both sides of the equation by 60. One oil in Venezuela has an opportunity cost of 1/2 lumber. Because 1/2 lumber < 2 lumber, Venezuela has the comparative advantage in producing oil.

Step 4. Calculate the opportunity cost of one lumber by reversing the numbers, with lumber on the left side of the equation. In Canada, 40 lumber is equivalent in labor time to 20 barrels of oil: 40 lumber = 20 oil. Divide each side of the equation by 40. The opportunity cost of one lumber is 1/2 oil.

In Venezuela, the equivalent labor time will produce 30 lumber or 60 oil: 30 lumber = 60 oil. Divide each side by 30. One lumber has an opportunity cost of two oil. Canada has the lower opportunity cost in producing lumber.

Step 5. In this example, absolute advantage is the same as comparative advantage. Canada has the absolute and comparative advantage in lumber; Venezuela has the absolute and comparative advantage in oil.

Step 6. Canada should specialize in what it has a relative lower opportunity cost, which is lumber, and Venezuela should specialize in oil. Canada will be exporting lumber and importing oil, and Venezuela will be exporting oil and importing lumber.

Try It

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Trade and Incomes

Incomes depend on labor productivity. A country with an absolute advantage in some product has higher labor productivity than another country does *in the production of that product.* If a country has an absolute advantage in producing both goods, it has higher labor productivity in both and its workers will earn higher incomes than those in the other country. Thus, the average income in a country depends on its average labor productivity. Now consider comparative advantage. If a country specializes production in the product in which it has a comparative advantage, it raises its average labor productivity and raises its average income. Thus, comparative advantage is more important than absolute advantage in understanding which country should trade which product in order to maximize the standard of living in both countries.

Watch It

Watch this video to review the ways that comparative advantage benefits all the parties involved.

A link to an interactive elements can be found at the bottom of this page.

For additional practice and review using numbers, watch this video from ACDC economics.

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15.5: Learn By Doing- Comparative Advantage and the Gains from Trade

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15.6: Learn By Doing- International Trade

Try It

Play the simulation below multiple times to see how different choices lead to different outcomes. You can click through the various choices to determine the best options for trade. The simulation allows for unlimited attempts so that you can gain experience applying the concepts.

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15.7: Intra-Industry Trade

Learning Objectives

- Identify at least two advantages of intra-industry trading
- Explain the relationship between economies of scale and intra-industry trade

Absolute and comparative advantages explain a great deal about global trading patterns. For example, they help to explain the patterns that we noted at the start of this module, like why you may be eating fresh fruit from Chile or Mexico, or why lower productivity regions like Africa and Latin America are able to sell a substantial proportion of their exports to higher productivity regions like the European Union and North America. Comparative advantage, however, at least at first glance, does not seem especially well-suited to explain other common patterns of international trade.

The Prevalence of Intra-industry Trade between Similar Economies

The theory of comparative advantage suggests that trade should happen between economies with large differences in opportunity costs of production. Roughly half of all world trade involves shipping goods between the fairly similar high-income economies of the United States, Canada, the European Union, Japan, Mexico, and China (see Table 1).

Table 1. Where U.S. Exports Go and U.S. Imports Originate (2015)(Source: https://www.census.gov/foreign-trade...ease/ft900.pdf)

Country	U.S. Exports Go to …	U.S. Imports Come from …
European Union	19.0%	21.0%
Canada	22.0%	14.0%
Japan	4.0%	6.0%
Mexico	15.0%	13.0%
China	8.0%	20.0%

Moreover, the theory of comparative advantage suggests that each economy should specialize to a degree in certain products, and then exchange those products. A high proportion of trade, however, is **intra-industry trade**—that is, trade of goods within the same industry from one country to another. For example, the United States produces and exports autos and imports autos. Table 2 shows some of the largest categories of U.S. exports and imports. In all of these categories, the United States is both a substantial exporter and a substantial importer of goods from the same industry. In 2014, according to the Bureau of Economic Analysis, the United States exported $146 billion worth of autos, and imported $327 billion worth of autos. About 60% of U.S. trade and 60% of European trade is intra-industry trade.

Table 2. Some Intra-Industry U.S. Exports and Imports in 2014 (Source: http://www.bea.gov/newsreleases/inte...ewsrelease.htm)

Some U.S. Exports	Quantity of Exports ($ billions)	Quantity of Imports ($ billions)
Autos	$146	$327
Food and beverages	$144	$126
Capital goods	$550	$551
Consumer goods	$199	$558
Industrial supplies	$507	$665
Other transportation	$45	$55

Why do similar high-income economies engage in intra-industry trade? What can be the economic benefit of having workers of fairly similar skills making cars, computers, machinery and other products which are then shipped across the oceans to and from the United States, the European Union, and Japan? There are two reasons: (1) The division of labor leads to learning, innovation, and unique skills; and (2) economies of scale.

Try It

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Watch It

Watch the selected portion of this video to see examples of intra-industry trade. The video introduces the Grubel-Lloyd Index, which assigns a numerical value for measuring and comparing intra-industry trade.

A link to an interactive elements can be found at the bottom of this page.

Gains from Specialization and Learning

Consider the category of machinery, where the U.S. economy has considerable intra-industry trade. Machinery comes in many varieties, so the United States may be exporting machinery for manufacturing with wood, but importing machinery for photographic processing. The underlying reason why a country like the United States, Japan, or Germany produces one kind of machinery rather than another is usually not related to U.S., German, or Japanese firms and workers having generally higher or lower skills. It is just that, in working on very specific and particular products, firms in certain countries develop unique and different skills.

Specialization in the world economy can be very finely split. In fact, recent years have seen a trend in international trade called **splitting up the value chain**. The **value chain** describes how a good is produced in stages. As indicated in the beginning of the module, the production of the iPhone involves the design and engineering of the phone in the United States, parts supplied from Korea, the assembly of the parts in China, and the advertising and marketing done in the United States. Thanks in large part to improvements in communication technology, sharing information, and transportation, it has become easier to split up the value chain.

Instead of production in a single large factory, all of these steps can be split up among different firms operating in different places and even different countries. Because firms split up the value chain, international trade often does not involve whole finished products like automobiles or refrigerators being traded between nations. Instead, it involves shipping more specialized goods like, say, automobile dashboards or the shelving that fits inside refrigerators. Intra-industry trade between similar countries produces economic gains because it allows workers and firms to learn and innovate on particular products—and often to focus on very particular parts of the value chain.

Economies of Scale, Competition, Variety

A second broad reason that intra-industry trade between similar nations produces economic gains involves economies of scale. The concept of **economies of scale** means that as the scale of output goes up, average costs of production decline—at least up to a point. Figure 2 illustrates economies of scale for a plant producing toaster ovens. The horizontal axis of the figure shows the quantity of production by a certain firm or at a certain manufacturing plant. The vertical axis measures the average cost of production. Production plant S produces a small level of output at 30 units and has an average cost of production of $30 per toaster oven. Plant M produces at a medium level of output at 50 units, and has an average cost of production of $20 per toaster oven. Plant L produces 150 units of output with an average cost of production of only $10 per toaster oven. Although plant V can produce 200 units of output, it still has the same unit cost as Plant L.

In this example, a small or medium plant, like S or M, will not be able to compete in the market with a large or a very large plant like L or V, because the firm that operates L or V will be able to produce and sell their output at a lower price. In this example, economies of scale operate up to point L, but beyond point L to V, the additional scale of production does not continue to reduce average costs of production.

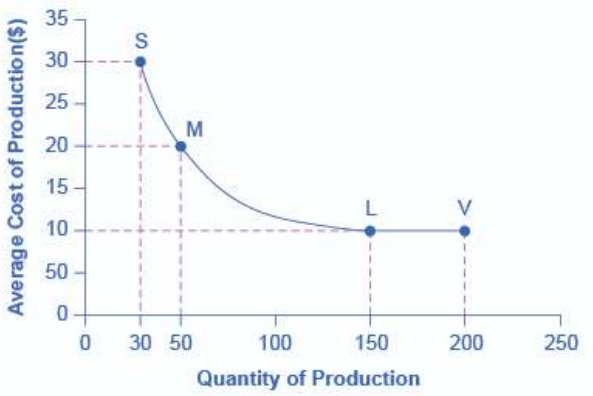


Figure 1. Economies of Scale Production. Plant S, has an average cost of production of $30 per toaster oven. Production plant M has an average cost of production of $20 per toaster oven. Production plant L has an average cost of production of only $10 per toaster oven. Production plant V would still have an average cost of production of $10 per toaster oven. Thus, production plant M can produce toaster ovens more cheaply than plant S because of economies of scale, and plants L or V can produce more cheaply than S or M because of economies of scale. However, the economies of scale end at an output level of 150. Plant V, despite being larger, cannot produce more cheaply on average than plant L.

The concept of economies of scale becomes especially relevant to international trade when it enables one or two large producers to supply the entire country. For example, a single large automobile factory could probably supply all the cars purchased in a smaller economy like the United Kingdom or Belgium in a given year. However, if a country has only one or two large factories producing cars, and no international trade, then consumers in that country would have relatively little choice between kinds of cars (other than the color of the paint and other nonessential options). Little or no competition will exist between different car manufacturers.

International trade provides a way to combine the lower average production costs that come from economies of scale and still have competition and variety for consumers. Large automobile factories in different countries can make and sell their products around the world. If the U.S. automobile market was made up of only General Motors, Ford, and Chrysler, the level of competition and consumer choice would be quite a lot lower than when U.S. carmakers must face competition from Toyota, Honda, Suzuki, Fiat, Mitsubishi, Nissan, Volkswagen, Kia, Hyundai, BMW, Subaru, and others. Greater competition brings with it innovation and responsiveness to what consumers want. America's car producers make far better cars now than they did several decades ago, and much of the reason is competitive pressure, especially from East Asian and European carmakers.

Try It

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Try It

Apple Corporation uses a global platform to produce the iPhone. Now that you understand the concept of comparative advantage, you can see why the engineering and design of the iPhone is done in the United States. The United States has built up a comparative advantage over the years in designing and marketing products, and sacrifices fewer resources to design high-tech devices relative to other countries. China has a comparative advantage in assembling the phone due to its large skilled labor force. Korea has a comparative advantage in producing components. Korea focuses its production by increasing its scale, learning better ways to produce screens and computer chips, and uses innovation to lower average costs of production. Apple, in turn, benefits because it can purchase these quality products at lower prices. Put the global assembly line together and you have the device with which we are all so familiar.

Dynamic Comparative Advantage

The sources of gains from intra-industry trade between similar economies—namely, the learning that comes from a high degree of specialization and splitting up the value chain and from economies of scale—do not contradict the earlier theory of comparative advantage. Instead, they help to broaden the concept.

In intra-industry trade, the level of worker productivity is not determined by climate or geography. It is not even determined by the general level of education or skill. Instead, the level of worker productivity is determined by how firms engage in specific learning about specialized products, including taking advantage of economies of scale. In this vision, comparative advantage can be dynamic—that is, it can evolve and change over time as new skills are developed and as the value chain is split up in new ways. This line of thinking also suggests that countries are not destined to have the same comparative advantage forever, but must instead be flexible in response to ongoing changes in comparative advantage.

Learning Objectives

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15.8: Demand and Supply Analysis of International Trade

Learning Objectives

- Use supply and demand to explain the gains from trade

Demand and Supply Analysis of International Trade

We can use the theory of supply and demand to further understand the benefits of international trade. Consider two countries, Brazil and the United States, who produce sugar. Each country has a domestic supply and demand for sugar, as detailed in Table 1 and illustrated in Figure 2. In Brazil, without trade, the equilibrium price of sugar is 12 cents per pound and the equilibrium output is 30 tons. When there is no trade in the United States, the equilibrium price of sugar is 24 cents per pound and the equilibrium quantity is 80 tons. These equilibrium points are labeled with the point E. Notice that in this set-up, Brazil is the low-cost provider of sugar and has the cost-advantage.

Table 1. The Sugar Trade between Brazil and the United States

Price	Brazil: Quantity Supplied (tons)	Brazil: Quantity Demanded (tons)	U.S.: Quantity Supplied (tons)	U.S.: Quantity Demanded (tons)
8 cents	20	35	60	100
12 cents	30	30	66	93
14 cents	35	28	69	90
16 cents	40	25	72	87
20 cents	45	21	76	83
24 cents	50	18	80	80
28 cents	55	15	82	78

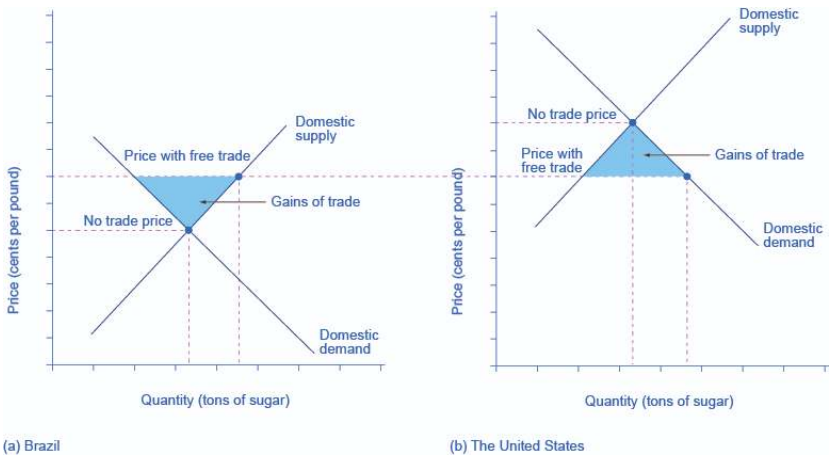


Figure 1.Free trade results in gains from trade. Total surplus increases in both countries. However, there are clear income distribution effects.

If international trade between Brazil and the United States now becomes possible, profit-seeking firms will spot an opportunity: buy sugar cheaply in Brazil, and sell it at a higher price in the United States. As sugar is shipped from Brazil to the United States, the quantity of sugar produced in Brazil will be greater than Brazilian consumption (with the extra production being exported), and the amount produced in the United States will be less than the amount of U.S. consumption (with the extra consumption being imported). Exports to the United States will reduce the supply of sugar in Brazil, raising its price. Imports into the United States will increase the supply of sugar, lowering its price. When the price of sugar is the same in both countries, there is no incentive to trade

further. As Figure 1 shows, the equilibrium with trade occurs at a price of 16 cents per pound. At that price, the sugar farmers of Brazil supply a quantity of 40 tons, while the consumers of Brazil buy only 25 tons.

The extra 15 tons of sugar production, shown by the horizontal gap between the demand curve and the supply curve in Brazil, is exported to the United States. In the United States, at a price of 16 cents, the farmers produce a quantity of 72 tons and consumers demand a quantity of 87 tons. The excess demand of 15 tons by American consumers, shown by the horizontal gap between demand and domestic supply at the price of 16 cents, is supplied by imported sugar.

Free trade typically results in income distribution effects, but the key is to recognize the overall gains from trade, as shown in Figure 1. Building on the concepts you have already learned about supply and demand and consumer and producer surplus, Figure 1(a) shows that producers in Brazil gain by selling more sugar at a higher price, while Figure 1(b) shows consumers in the United States benefit from the lower price and greater availability of sugar. Consumers in Brazil are worse off (compare their no- trade consumer surplus with the free-trade consumer surplus) and U.S. producers of sugar are worse off. There are gains from trade—an increase in social surplus in each country. That is, both the United States and Brazil are better off than they would be without trade.

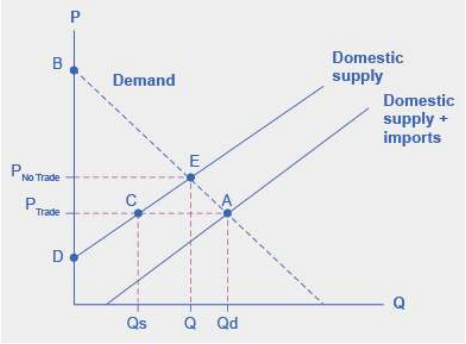


Figure 2. When there is free trade, the equilibrium is at point A. When there is no trade, the equilibrium is at point E.

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15.9: Learn By Doing- Demand and Supply Analysis of International Trade

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15.10: Introduction to the Trade Barriers and Protectionism

What you'll learn to do: explain how barriers to trade (like tariffs, quotas and non-tariff barriers) affect businesses, consumers and workers in the economy



We have seen that international trades raises the standard of living for participating countries. Indeed, free trade maximizes the gains from international trade. While each country is better off through international trade (or more precisely, the average resident is better off), that doesn't mean that all individuals are better off. Free trade is a policy and like every policy, there are winners and losers. The winners are consumers and workers, managers and owners of firms that produce goods whose demand increases through international trade. The losers are workers, managers and owners of firms whose demand decreases as a result of international trade; that is, firms who produce substitutes for imports.

Protectionism is an attempt to mitigate the harm done by international trade. The most prominent argument for tariffs, quotas and other barriers to trade is to protect jobs and incomes that otherwise would be at risk from foreign imports. This section will explore these issues.

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15.11: Protectionism

Learning Objectives

- Describe why governments may justify protectionist policies
- Explain and give examples of trade barriers, including quotas, tariffs, and nontariff barriers

Protectionism

Globalization has brought fear of loss of jobs and loss of income, which are often described as the “race to the bottom,” as industrialized countries are thought to have to reduce wages to be competitive with those in the developing world. Globalization has also spawned fears about loss of culture. Many countries worry about their cultures being overwhelmed by that of the United States. France is a good example. Others fear replacement of their cultures by that of Western nations (e.g., some Islamic states). Countries also fear the loss of national sovereignty as they become part of supranational entitles, like the European Union or the International Monetary Fund. And yet, history shows that globalization has corresponded to higher national incomes and increased opportunities. How can these conflicting views be reconciled?

When a government legislates policies to reduce or block international trade it is engaging in **protectionism**. Protectionist policies often seek to shield domestic producers and domestic workers from foreign competition. The Trump Administration’s tariffs on steel and aluminum in 2018 are a recent example.

Watch It

A government may justify protectionist policies for one of the following reasons, which are outlined in this video:

1. Protect domestic jobs.
2. Level the playing field.
3. Raise additional revenue for the domestic government.
4. National defense—protect some industries in case of time of war.
5. Infant industries—protect new industries until they are more mature
6. Promote exports.

A link to an interactive elements can be found at the bottom of this page.

Try It

How do people around the world feel about expanding trade between nations? In summer 2007, the Pew Foundation surveyed 45,000 people in 47 countries. One of the questions asked about opinions on growing trade ties between countries. Table 20.3 shows the percentages who answered either “very good” or “somewhat good” for some of countries surveyed.

For those who think of the United States as the world’s leading supporter of expanding trade, the survey results may be perplexing. When adding up the shares of those who say that growing trade ties between countries is “very good” or “somewhat good,” Americans had the least favorable attitude toward increasing globalization, while the Chinese and South

Africans ranked highest. In fact, among the 47 countries surveyed, the United States ranked by far the lowest on this measure, followed by Egypt, Italy, and Argentina.

Country	Very Good	Somewhat Good	Total
China	38%	53%	91%
South Africa	42%	43%	87%
South Korea	24%	62%	86%
Germany	30%	55%	85%
Canada	29%	53%	82%
United Kingdom	28%	50%	78%
Mexico	22%	55%	77%
Brazil	13%	59%	72%
Japan	17%	55%	72%
United States	14%	45%	59%

Table 1. The Status of Growing Trade Ties between Countries. (Source: http://www.pewglobal.org/files/pdf/258.pdf)

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https://assessments.lumenlearning.co...sessments/7684

Barriers to Trade

Protectionism takes three main forms: tariffs, import quotas, and nontariff barriers. **Tariffs** are taxes that a government imposes on imported goods and services. This makes imports more expensive for consumers, discouraging purchases of imports in favor or domestic substitutes. For example, in recent years large, flat-screen televisions imported to the U.S. from China have faced a 5% tariff rate.

Another way to control trade is through **import quotas**, which are numerical limitations on the quantity of products that a country can import. For instance, during the early 1980s, the Reagan Administration imposed a quota on the import of Japanese automobiles. In the 1970s, many developed countries, including the United States, found themselves with declining textile industries. Textile production does not require highly skilled workers, so producers were able to set up lower-cost factories in developing countries. In order to "manage" this loss of jobs and income, the developed countries established an international Multifiber Agreement that essentially divided the market for textile exports between importers and the remaining domestic producers. The agreement, which ran from 1974 to 2004, specified the exact quota of textile imports that each developed country would accept from each low-income country. A similar story exists for sugar imports into the United States, which are still governed by quotas.

Nontariff barriers are all the other ways that a nation can draw up rules, regulations, inspections, and paperwork to make it more costly or difficult to import products. A rule requiring certain safety standards can limit imports just as effectively as high tariffs or low import quotas, for instance. There are also nontariff barriers in the form of "rules-of-origin" regulations; these rules describe the "Made in Country X" label as the one in which the last substantial change in the product took place. A manufacturer wishing to

evade import restrictions may try to change the production process so that the last big change in the product happens in his or her own country. For example, certain textiles are made in the United States, shipped to other countries, combined with textiles made in those other countries to make apparel—and then re-exported back to the United States for a final assembly, to escape paying tariffs or to obtain a “Made in the USA” label.

Despite import quotas, tariffs, and nontariff barriers, the share of apparel sold in the United States that is imported rose from about half in 1999 to about three-quarters today. The U.S. Bureau of Labor Statistics (BLS), estimated the number of U.S. jobs in textiles and apparel fell from 666,360 in 2007 to 385,240 in 2012, a 42% decline. Even more U.S. textile industry jobs would have been lost without tariffs. However, domestic jobs that are saved by import quotas come at a cost. Because textile and apparel protectionism adds to the costs of imports, consumers end up paying billions of dollars more for clothing each year. Some of those “consumers” are domestic producers of other goods, like motor vehicles, for example. Higher prices for steel and aluminum increase the cost of producing motor vehicles, making them harder to sell domestically and internationally. Thus, it’s not clear that protectionism saves domestic jobs or incomes.

When the United States eliminates trade barriers in one area, consumers spend the money they save on that product elsewhere in the economy. Thus, while eliminating trade barriers in one sector of the economy will likely result in some job loss in that sector, consumers will spend the resulting savings in other sectors of the economy and hence increase the number of jobs in those other sectors. Of course, workers in some of the poorest countries of the world who would otherwise have jobs producing textiles, would gain considerably if the United States reduced its barriers to trade in textiles. That said, there are good reasons to be wary about reducing barriers to trade. The 2012 and 2013 Bangladeshi fires in textile factories, which resulted in a horrific loss of life, present complications that our simplified analysis in the chapter will not capture.

Watch It

Watch this video to learn more about different types of trade barriers: tariffs, quotas, voluntary export restraints, and nontariff barriers like health and safety regulations.

A link to an interactive elements can be found at the bottom of this page.

Try It

https://assessments.lumenlearning.co...sessments/7685
https://assessments.lumenlearning.co...sessments/7686

Realizing the compromises between nations that come about due to trade policy, many countries came together in 1947 to form the General Agreement on Tariffs and Trade (GATT). (We’ll cover the GATT in more detail later in the module.) This agreement has since been superseded by the World Trade Organization (WTO), whose membership includes about 150 nations and most of the world’s economies. It is the primary international mechanism through which nations negotiate their trade rules—including rules about tariffs, quotas, and nontariff barriers. The next section examines the results of such protectionism.

Learning Objectives

[glossary-page][glossary-term]globalization:[/glossary-term]
[glossary-definition]the increase in interaction between peoples around the world that involves the sharing of ideas, cultures, goods, services and investment[/glossary-definition][glossary-term]import quotas:[/glossary-term]
[glossary-definition]numerical limits on the quantity of products that a country can import[/glossary-definition][glossary-term]nontariff barriers:[/glossary-term]
[glossary-definition]ways a nation can draw up rules, regulations, inspections, and paperwork to make it more costly or difficult to import products[/glossary-definition][glossary-term]protectionism:[/glossary-term]
[glossary-definition]government policies to reduce or block imports[/glossary-definition][glossary-term]tariff:[/glossary-term]
[glossary-definition]a tax on imports, designed to protect domestic industry[/glossary-definition][/glossary-page]

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15.12: The Tradeoffs of International Trade

Learning Objectives

- Analyze the tradeoffs of trade policy, identifying at least two benefits from reducing trade barriers

The Tradeoffs of International Trade

Economists readily acknowledge that international trade is not all sunshine, roses, and happy endings. Over time, the average person gains from international trade, both as a worker who has greater productivity and higher wages because of the benefits of specialization and comparative advantage, and as a consumer who can benefit from shopping all over the world for a greater variety of quality products at attractive prices. The "average person," however, is hypothetical, not real—representing a mix of those who have done very well, those who have done all right, and those who have done poorly. It is a legitimate concern of public policy to focus not just on the average or on the success stories, but also on those have not been so fortunate. Workers in other countries, the environment, and prospects for new industries and materials that might be of key importance to the national economy are also all legitimate issues.

The common belief among economists is that it is better to embrace the gains from trade, and then deal with the costs and tradeoffs with other policy tools, for example, retraining workers who lose their jobs to imports, than it is to cut off trade to avoid the costs and tradeoffs.

To gain a better intuitive understanding for this argument, consider a hypothetical American company called Technotron. Technotron invents a new scientific technology that allows the firm to increase the output and quality of its goods with a smaller number of workers at a lower cost. As a result of this technology, other U.S. firms in this industry will lose money and will also have to lay off workers—and some of the competing firms will even go bankrupt. Should the United States government protect the existing firms and their employees by making it illegal for Technotron to use its new technology?

Most people who live in market-oriented economies would oppose trying to block better products that lower the cost of services. Certainly, there is a case for society providing temporary support and assistance for those who find themselves without work. Many would argue for government support of programs that encourage retraining and acquiring additional skills. Government might also support research and development efforts, so that other firms may find ways of outdoing Technotron. Blocking the new technology altogether, however, seems like a mistake. After all, few people would advocate giving up electricity because it caused so much disruption to the kerosene and candle business. Few would suggest holding back on improvements in medical technology because they might cause companies selling leeches and snake oil to lose money. In short, most people view disruptions due to technological change as a necessary cost that is worth bearing.

Now, imagine that Technotron's new "technology" is as simple as this: the company imports what it sells from another country. In other words, think of foreign trade as a type of innovative technology. The objective situation is now exactly the same as before. Because of Technotron's new technology—which in this case is importing goods from another county—other firms in this industry will lose money and lay off workers. Just as it would have been inappropriate and ultimately foolish to respond to the disruptions of new scientific technology by trying to shut it down, it would be inappropriate and ultimately foolish to respond to the disruptions of international trade by trying to restrict trade.

Some workers and firms will suffer because of international trade. In a living, breathing market-oriented economy, some workers and firms will always be experiencing disruptions, for a wide variety of reasons. Corporate management can be better or worse. Workers for a certain firm can be more productive or less. Tough domestic competitors can create just as much disruption as tough foreign competitors. Sometimes a new product is a hit with consumers; sometimes it is a flop. Sometimes a company is blessed by a run of good luck or stricken with a run of bad luck. For some firms, international trade will offer great opportunities for expanding productivity and jobs; for other firms, trade will impose stress and pain. The disruption caused by international trade is not fundamentally different from all the other disruptions caused by the other workings of a market economy.

In other words, the economic analysis of free trade does not rely on a belief that foreign trade is not disruptive or does not pose tradeoffs; indeed, the story of Technotron begins with a particular **disruptive market change**—a new technology—that causes real tradeoffs. In thinking about the disruptions of foreign trade, or any of the other possible costs and tradeoffs of foreign trade

discussed in this module, the best public policy solutions typically do not involve protectionism, but instead involve finding ways for public policy to address the particular issues, while still allowing the benefits of international trade to occur.

Low-income countries benefit more from trade than high-income countries do. In some ways, the giant U.S. economy has less need for international trade, because it can already take advantage of internal trade within its economy. However, many smaller national economies around the world, in regions like Latin America, Africa, the Middle East, and Asia, have much more limited possibilities for trade inside their countries or their immediate regions. Without international trade, they may have little ability to benefit from comparative advantage, slicing up the value chain, or economies of scale. Moreover, smaller economies often have fewer competitive firms making goods within their economy, and thus firms have less pressure from other firms to provide the goods and prices that consumers want.

The economic gains from expanding international trade are measured in hundreds of billions of dollars, and the gains from international trade as a whole probably reach well into the trillions of dollars. The potential for gains from trade may be especially high among the smaller and lower-income countries of the world.

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Flat-panel displays, the displays for laptop computers, tablets, and flat screen televisions, are an example of such an enduring principle. In the early 1990s, the vast majority of flat-panel displays used in U.S.-manufactured laptops were imported, primarily from Japan. The small but politically powerful U.S. flat-panel-display industry filed a dumping complaint with the Commerce Department. They argued that Japanese firms were selling displays at “less than fair value,” which made it difficult for U.S. firms to compete. After a preliminary determination by the Commerce Department that the Japanese firms were dumping, the U.S. International Trade Commission imposed a 63% dumping margin (or tax) on the import of flat-panel displays. Was this a successful exercise of U.S. trade policy?

Flat-panel displays make up a significant portion of the cost of producing laptop computers—as much as 50%. Therefore, the antidumping tax would substantially increase the cost, and thus the price, of U.S.-manufactured laptops. As a result of the ITC’s decision, Apple moved its domestic manufacturing plant for Macintosh computers to Ireland (where it had an existing plant). Toshiba shut down its U.S. manufacturing plant for laptops. And IBM cancelled plans to open a laptop manufacturing plant in North Carolina, instead deciding to expand production at its plant in Japan. In this case, rather than having the desired effect of protecting U.S. interests and giving domestic manufacturing an advantage over items manufactured elsewhere, it had the unintended effect of driving the manufacturing completely out of the country. Many people lost their jobs and most flat-panel display production now occurs in countries other than the United States.

From Interpersonal to International Trade

Most people find it easy to believe that they, personally, would not be better off if they tried to grow and process all of their own food, to make all of their own clothes, to build their own cars and houses from scratch, and so on. Instead, we all benefit from living in economies where people and firms can specialize and trade with each other.

The benefits of trade do not stop at national boundaries, either. The division of labor could increase output for three reasons: (1) workers with different characteristics can specialize in the types of production where they have a comparative advantage; (2) firms and workers who specialize in a certain product become more productive with learning and practice; and (3) economies of scale. These three reasons apply from the individual and community level right up to the international level. If it makes sense to you that interpersonal, intercommunity, and interstate trade offer economic gains, it should make sense that international trade offers gains, too.

International trade currently involves about $20 trillion worth of goods and services moving around the globe. Any economic force of that size, even if it confers overall benefits, is certain to cause disruption and controversy.

Learning Objectives

[glossary-page][glossary-term]disruptive market change: [/glossary-term]
[glossary-definition]innovative new product or production technology which disrupts the status quo in a market, leading the innovators to earn more income and profits and the other firms to lose income and profits, unless they can come up with their own innovations[/glossary-definition]
[/glossary-page]

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15.13: Introduction to Trade Policy and Agreements

What you'll learn to do: differentiate between alternative international trade regimes and how they impact global trade



Every country must adopt a policy on international trade. Free trade is one option, as is autarky (no international trade), and everything in between. Political pressures to protect special interests collide with those promoting the benefits of free trade. The result is a country's trade policy, which is often a compromise between competing politics.

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15.14: The Role of the GATT in Reducing Barriers to Trade

Learning Objectives

- Explain the origin and role of the General Agreement on Tariffs and Trade (GATT)

Reducing Barriers to Trade

As you know, **tariffs** are taxes that governments place on imported goods for a variety of reasons. Some of these reasons include protecting sensitive industries, for humanitarian reasons, and protecting against **dumping**. Traditionally, tariffs were often used as a political tool to protect certain vested economic, social, and cultural interests.

At the beginning of the Great Depression in 1930, the U.S. Congress passed the Smoot-Hawley Tariff Act to protect American jobs and industries from foreign competition. This act raised U.S. tariffs on dutiable imports to nearly 60%. U.S. trading partners retaliated by raising their own tariffs on U.S. exports, with the result that international trade between the [warring] nations declined by half. The consensus among economists is that the Smoot-Hawley tariffs contributed significantly to the depth and length of the Great Depression.

At the end of World War II, there was a consensus that tariffs were too high worldwide, and that tariff reductions could stimulate international trade and return the world to a thriving, peacetime economy. In the years after the Great Depression and World War II, there was a worldwide push to build institutions that would tie the nations of the world together. The United Nations officially came into existence in 1945. The World Bank, which assists the poorest people in the world, and the International Monetary Fund, which addresses issues raised by international financial transactions, were both created in 1946. The third planned organization was to be an International Trade Organization, which would manage international trade. The United Nations was unable to agree to this. Instead, the **General Agreement on Tariffs and Trade (GATT)**, was established in 1947 to provide a forum in which nations could come together to negotiate reductions in tariffs and other barriers to trade. In 1995, the GATT was transformed into the World Trade Organization (WTO).

The GATT process was to negotiate an agreement to reduce barriers to trade, sign that agreement, pause for a while, and then start negotiating the next agreement. The rounds of talks in the GATT, and now the WTO, are shown in Table 1. Notice that the early rounds of GATT talks took a relatively short time, included a small number of countries, and focused almost entirely on reducing tariffs. Since the 1970s, however, rounds of trade talks have taken years, included a large number of countries, and an ever-broadening range of issues.

Table 1. The Negotiating Rounds of GATT and the World Trade Organization

Year	Place or Name of Round	Main Subjects	Number of Countries Involved
1947	Geneva	Tariff reduction	23
1949	Annecy	Tariff reduction	13
1951	Torquay	Tariff reduction	38
1956	Geneva	Tariff reduction	26
1960–61	Dillon round	Tariff reduction	26
1964–67	Kennedy round	Tariffs, anti-dumping measures	62
1973–79	Tokyo round	Tariffs, nontariff barriers	102
1986–94	Uruguay round	Tariffs, nontariff barriers, services, intellectual property, dispute settlement, textiles, agriculture, creation of WTO	123
2001–	Doha round	Agriculture, services, intellectual property, competition, investment, environment, dispute settlement	147

The sluggish pace of GATT negotiations led to an old joke that GATT really stood for Gentleman's Agreement to Talk and Talk. The slow pace of international trade talks, however, is understandable, even sensible. Having dozens of nations agree to any treaty is a lengthy process. GATT often set up separate trading rules for certain industries, like agriculture, and separate trading rules for certain countries, like the low-income countries. There were rules, exceptions to rules, opportunities to opt out of rules, and precise wording to be fought over in every case.

Watch It

Watch this video to review some of these major trade agreements.

A link to an interactive elements can be found at the bottom of this page.

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Learning Objectives

[glossary-page][glossary-term]General Agreement on Tariffs and Trade (GATT):[/glossary-term][glossary-definition]forum in which nations could come together to negotiate reductions in tariffs and other barriers to trade; the precursor to the World Trade Organization[/glossary-definition][glossary-term]tariffs:[/glossary-term]
[glossary-definition]taxes that governments place on imported goods[/glossary-definition][/glossary-page]

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15.15: Trade Policy- Organizations and Agreements

Learning Objectives

- Explain the origin and role of the World Trade Organization (WTO)
- Discuss the significance and provide examples of regional trading agreements
- Analyze trade policy and evaluate long-term trends in barriers to trade

How Trade Policy Is Enacted: Globally, Regionally, and Nationally

Nations participate in global and regional trade agreements. They also develop their own national trade policies. The purpose of these agreements is to define what constitutes fair trading practices in different contexts.

The World Trade Organization

The **World Trade Organization (WTO)** was established in 1995, as the successor to the General Agreement on Tariffs and Trade (GATT), which was discussed in the last section. The WTO is committed to lowering barriers to trade. The world's nations meet through the WTO to negotiate how they can reduce barriers to trade, such as tariffs. WTO negotiations happen in "rounds," where all countries negotiate one agreement to encourage trade, take a year or two off, and then start negotiating a new agreement. The current round of negotiations is called the Doha Round because it was officially launched in Doha, the capital city of Qatar, in November 2001. In 2009, economists from the World Bank summarized recent research and found that the Doha round of negotiations would increase the size of the world economy by $160 billion to $385 billion per year, depending on the precise deal that ended up being negotiated.

In the context of a global economy that currently produces more than $30 trillion of goods and services each year, this amount is not huge: it is an increase of 1% or less. But before dismissing the gains from trade too quickly, it is worth remembering two points.

- First, a gain of a few hundred billion dollars is enough money to deserve attention! Moreover, remember that this increase is not a one-time event; it would persist each year into the future.
- Second, the estimate of gains may be on the low side because some of the gains from trade are not measured especially well in economic statistics. For example, it is difficult to measure the potential advantages to consumers of having a variety of products available and a greater degree of competition among producers. Perhaps the most important unmeasured factor is that trade between countries, especially when firms are splitting up the value chain of production, often involves a transfer of knowledge that can involve skills in production, technology, management, finance, and law.

Low-income countries benefit more from trade than high-income countries do. In some ways, the giant U.S. economy has less need for international trade, because it can already take advantage of internal trade within its economy. However, many smaller national economies around the world, in regions like Latin America, Africa, the Middle East, and Asia, have much more limited possibilities for trade inside their countries or their immediate regions. Without international trade, they may have little ability to benefit from comparative advantage, slicing up the value chain, or economies of scale. Moreover, smaller economies often have fewer competitive firms making goods within their economy, and thus firms have less pressure from other firms to provide the goods and prices that consumers want.

The economic gains from expanding international trade are measured in hundreds of billions of dollars, and the gains from international trade as a whole probably reach well into the trillions of dollars. The potential for gains from trade may be especially high among the smaller and lower-income countries of the world.

Like the GATT before it, the WTO is not a world government, with power to impose its decisions on others. The total staff of the WTO in 2013 is 629 people and its annual budget (as of 2012) is $196 million, which makes it smaller in size than many large universities.

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Regional Trading Agreements

There are different types of economic integration across the globe, ranging from **free trade agreements**, in which participants allow each other's imports without tariffs or quotas, to **common markets**, in which participants have a common external trade policy as well as free trade within the group, to full **economic unions**, in which, in addition to a common market, monetary and fiscal policies are coordinated. Many nations belong both to the World Trade Organization and to regional trading agreements.

The best known of these regional trading agreements is the **European Union**. In the years after World War II, leaders of several European nations reasoned that if they could tie their economies together more closely, they might be more likely to avoid another devastating war. Their efforts began with a free trade association, evolved into a common market, and then transformed into what is nearly a full economic union, known as the European Union. (The EU, as it is often called, has not included a common fiscal policy.) The EU has a number of goals. For example, in the early 2000s it introduced a common currency for Europe, the euro, and phased out most of the former national forms of money like the German mark and the French franc, though a few have retained their own currency. Another key element of the union is to eliminate barriers to the mobility of goods, labor, and capital across Europe.

For the United States, perhaps the best-known regional trading agreement is the **North American Free Trade Agreement (NAFTA)**. The United States also participates in some less-prominent regional trading agreements, like the Caribbean Basin Initiative, which offers reduced tariffs for imports from these countries, and a free trade agreement with Israel.

The world has seen a flood of regional trading agreements in recent years. About 100 such agreements are now in place. A few of the more prominent ones are listed in Table 2. Some are just agreements to continue talking; others set specific goals for reducing tariffs, import quotas, and nontariff barriers. One economist described the current trade treaties as a "spaghetti bowl," which is what a map with lines connecting all the countries with trade treaties looks like.

There is concern among economists who favor free trade that some of these regional agreements may promise free trade, but actually act as a way for the countries within the regional agreement to try to limit trade from anywhere else. In some cases, the regional trade agreements may even conflict with the broader agreements of the World Trade Organization.

Table 2. Some Regional Trade Agreements

Trade Agreements	Participating Countries
Asia Pacific Economic Cooperation (APEC)	Australia, Brunei, Canada, Chile, People's Republic of China, Hong Kong, China, Indonesia, Japan, Republic of Korea, Malaysia, Mexico, New Zealand, Papua New Guinea, Peru, Philippines, Russia, Singapore, Chinese Taipei, Thailand, United States, Vietnam
European Union (EU)	Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom
North America Free Trade Agreement (NAFTA)	Canada, Mexico, United States
Latin American Integration Association (LAIA)	Argentina, Bolivia, Brazil, Chile, Columbia, Ecuador, Mexico, Paraguay, Peru, Uruguay, Venezuela
Association of Southeast Asian Nations (ASEAN)	Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, Vietnam
Southern African Development Community (SADC)	Angola, Botswana, Congo, Lesotho, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia, Zimbabwe

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National Trade Policies

Yet another dimension of trade policy, along with international and regional trade agreements, happens at the national level. Ideally, these policies do not conflict with the rules of the WTO and regional trade agreements. When there is an apparent conflict, the parent organization must adjudicate it. The United States, for example, imposes import quotas on sugar, because of a fear that such imports would drive down the price of sugar and thus injure domestic sugar producers. Why is sugar favored, while other products are not? Sometimes a product is protected because of historical practice. Sometimes it's because a product has a particularly strong lobby. Recall, though, that trade barriers always end up costing a nation more than the benefits received by the protected group.

One of the jobs of the United States Department of Commerce is to determine if imports from other countries are being traded fairly. A common complaint is dumping, which means that foreign imports are being sold at less than their fair market value, i.e. their cost. The Commerce Department estimates a dumping "margin," that is, the difference between price and cost. If Commerce determines that the import price is less than cost, they find that dumping has occurred. The United States International Trade Commission—another government agency—determines whether domestic industries have been substantially injured by the dumping, and if so, the President can impose tariffs in the amount of the dumping margin to offset the unfairly low price.

In the arena of trade policy, the battle often seems to be between national laws that increase protectionism and international agreements that try to reduce protectionism, like the WTO. Why would a country pass laws or negotiate agreements to shut out certain foreign products, like sugar or textiles, while simultaneously negotiating to reduce trade barriers in general? One plausible answer is that international trade agreements offer a method for countries to restrain their own special interests. A member of Congress can say to an industry lobbying for tariffs or quotas on imports: "Sure would like to help you, but that pesky WTO agreement just won't let me."

Try It

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WatCh It

This video provides more information about trade blocs and the ways in which nations make arrangements regarding trade.

A link to an interactive elements can be found at the bottom of this page.

Watch this next video for a recent news example of an actual trade agreement between the United States and South Korea.

A link to an interactive elements can be found at the bottom of this page.

Long-Term Trends in Barriers to Trade

In newspaper headlines, trade policy appears mostly as disputes and acrimony. Countries are almost constantly threatening to challenge the "unfair" trading practices of other nations. Cases are brought to the dispute settlement procedures of the WTO, the European Union, NAFTA, and other regional trading agreements. Politicians in national legislatures, goaded on by lobbyists, often threaten to pass bills that will "establish a fair playing field" or "prevent unfair trade"—although most such bills seek to accomplish these high-sounding goals by placing more restrictions on trade. Protesters in the streets may object to specific trade rules or to the entire practice of international trade.

Through all the controversy, the general trend for most of the last 60 years is clearly toward lower barriers to trade. The average level of tariffs on imported products charged by industrialized countries was 40% in 1946. By 1990, after decades of GATT negotiations, it was down to less than 5%. Indeed, one of the reasons that GATT negotiations shifted from focusing on tariff reduction in the early rounds to a broader agenda was that tariffs had been reduced so dramatically there was not much more to do in that area. U.S. tariffs have followed this general pattern: After rising sharply during the Great Depression, tariffs dropped off to

less than 2% by the end of the century. Although measures of import quotas and nontariff barriers are less exact than those for tariffs, they generally appear to be at lower levels, too.

Thus, the last half-century has seen both a dramatic reduction in government-created barriers to trade, such as tariffs, import quotas, and nontariff barriers, and also a number of technological developments that have made international trade easier, like advances in transportation, communication, and information management. The result has been the powerful surge of international trade.

Try It

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Learning Objectives

[glossary-page][glossary-term]common market: [/glossary-term]
[glossary-definition]economic agreement between countries to allow free trade in goods, services, labor, and financial capital between members while having a common external trade policy[/glossary-definition]
[glossary-term]dumping: [/glossary-term][glossary-definition]selling imports at a price below fair market value, i.e. cost[/glossary-definition][glossary-term]economic union: [/glossary-term]
[glossary-definition]economic agreement between countries to allow free trade between members, a common external trade policy, and coordinated monetary and fiscal policies[/glossary-definition][glossary-term]free trade agreement:[/glossary-term]
[glossary-definition]economic agreement between countries to allow free trade between members[/glossary-definition]
[/glossary-page]

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15.16: Putting It Together- Globalization and International Trade

The goal of this module was to analyze the benefits and costs of international trade, and to determine the extent to which barriers to international trade are warranted.

You learned how to:

- Define and calculate comparative and absolute advantage
- Define and calculate gains from trade
- Understand the way imports and exports impact different actors in the economy (businesses, consumers, and workers)
- Explain how globalization has increased over time, especially over the last several decades
- Understand the way barriers to trade (e.g. tariffs, quotas and non-tariff barriers) affect business, consumers and workers in the economy.
- Differentiate between alternative international trade regimes and how they impact global trade

You learned that trade based on comparative advantage will maximize an individual's or a nation's income, but that there will be winners and losers to trade. For example, employees and owners of a firm that loses business to foreign imports are worse off, even though their loss is less than the gain to consumers. The challenge for policymakers is how to compensate the losers while capturing the gains from trade. Similarly, protectionism benefits some workers and businesses at the expense of other workers and businesses and at the expense of consumers. In this case, the losses to the latter groups are larger than the gains to the former groups. In that sense, protectionism makes a country worse off.

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15.17: Discussion- Absolute and Comparative Advantage

Respond to the following prompts in a post with a minimum of 250 words, then comment on at least TWO other posts. Respond to the posts indicating your agreement or disagreement with their position and why. Feel free to bring in additional references to these reply posts.

Many opponents of free trade use the following example to illustrate its negative effects:

Joe Smith started the day early having set his alarm clock (MADE IN JAPAN) for 6AM. While his coffeepot (MADE IN CHINA) was perking, he shaved with his electric razor (MADE IN HONG KONG). He put on a dress shirt (MADE IN SRI LANKA), designer jeans (MADE IN SINGAPORE) and tennis shoes (MADE IN KOREA). After cooking his breakfast in his new electric skillet (MADE IN INDIA) he sat down with his calculator (MADE IN MEXICO) to see how much he could spend today. After setting his watch (MADE IN TAIWAN) to the radio (MADE IN INDIA) he got in his car (MADE IN GERMANY) filled it with gas from SAUDI ARABIA and continued his search for a good paying AMERICAN JOB. At the end of yet another discouraging and fruitless day he checked email on his computer (MADE IN MALAYSIA) then decided to relax for a while. He put on his sandals (MADE IN BRAZIL) poured himself a glass of wine (MADE IN FRANCE) and turned on his TV (MADE IN INDONESIA), and then wondered WHY he can't find a good-paying job in America.

Discussion

- Should America encourage free trade with its trading partners or seek a more protectionist approach? Take a stand on this issue. It is not enough to argue BOTH sides of the issue. Support your opinion with good economic reasoning. Who benefits from your approach and who loses? Why? Include impacts on both American citizens and the citizens of the other countries with whom we (U.S.) trade. If your home country is outside the U.S. indicate the possible impact of your stand (favoring either free trade or trade protectionism) on your country. Some common search topics include employment, tariffs, quotas, and free trade agreements.
- Find a recent news article or editorial (past 12 months) that supports your point of view. Summarize the article, indicate how it supports your answer to #1, and include the URL.

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15.18: Assignment- Absolute and Comparative Advantage

Suppose that the United States and Saudi Arabia can each produce two products, oil and personal computers. The labor requirements per unit of output are provided in the table below:

Labor Requirements Per Unit of Output		
	United States	Saudi Arabia
Oil	10	8
Personal Computers	30	4

Calculate the labor and opportunity costs for each good, and then compute each country's absolute and comparative advantage. Use the results to determine what good each country should export and explain your reasoning.

1. What does absolute advantage mean? How do you calculate absolute advantage?
2. Which country has an absolute advantage in producing oil? Explain using the data from the table.
3. Which country has an absolute advantage in producing personal computers? Explain using the data from the table.
4. What does comparative advantage mean? How do you calculate comparative advantage?
5. In what output(s) does the U.S. have a comparative advantage? Explain using the data from the table.
6. In what output(s) does Saudi Arabia have a comparative advantage? Explain using the data from the table.
7. What product should each country export? Why?

Criteria	**Not Evident**	**Developing**	**Proficient**	**Distinguished**	**Weight**
Define absolute advantage					2
Compute the absolute advantage each good, show your work with correct notation					2
Explain which country has the absolute advantage in each good and justify					4
Compute comparative advantage for each good, show you work with correct notation					2
Explain which country has the comparative advantage for each good and justify					4
Describe what good each country should export and justify					4
Articulation of response (citations, grammar, spelling, syntax, or organization that negatively impact readability and articulation of main ideas.)					2
				Total:	/20

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15.19: Assignment- Problem Set — Globalization and Trade

Click on the following link to download the problem set for this module:

- Globalization and Trade Problem Set

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CHAPTER OVERVIEW

16: Exchange Rates and International Finance

16.1: Why It Matters- Exchange Rates and International Finance
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16.4: Strengthening and Weakening Currency
16.5: Introduction to Exchange Rates and Purchasing Power
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16.1: Why It Matters- Exchange Rates and International Finance

Why learn about exchange rates and the way they influence international trade?



Figure 1.Trade Around the World. Is a trade deficit between the United States and the European Union good or bad for the U.S. economy? (Credit: modification of work by Milad Mosapoor/Wikimedia Commons)

Try It

From 2002 to 2008, the U.S. dollar lost more than a quarter of its value in foreign currency markets. On January 1, 2002, one dollar was worth 1.11 euros. On April 24, 2008 it hit its lowest point with a dollar being worth 0.64 euros. During this period, the trade deficit between the United States and the European Union grew from a yearly total of approximately –85.7 billion dollars in 2002 to 95.8 billion dollars in 2008. Was this a good thing or a bad thing for the U.S. economy?

We live in a global world. U.S. consumers buy trillions of dollars worth of imported goods and services each year, not just from the European Union, but from all over the world. U.S. businesses sell trillions of dollars' worth of exports. U.S. citizens, businesses, and governments invest trillions of dollars abroad every year. Foreign investors, businesses, and governments invest trillions of dollars in the United States each year. Indeed, foreigners are a major buyer of U.S. federal debt.

Many people feel that a weaker dollar is bad for America, that it's an indication of a weak economy. But is it? This section will help answer that question.

The world has over 150 different currencies, from the Afghanistan afghani and the Albanian lek all the way through the alphabet to the Zambian kwacha and the Zimbabwean dollar. For international economic transactions, households or firms will wish to exchange one currency for another. Perhaps the need for exchanging currencies will come from a German firm that exports products to Russia, but then wishes to exchange the Russian rubles it has earned for euros, so that the firm can pay its workers and suppliers in Germany. Perhaps it will be a South African firm that wishes to purchase a mining operation in Angola, but to make the purchase it must convert South African rand to Angolan kwanza. Perhaps it will be an American tourist visiting China, who wishes to convert U.S. dollars to Chinese yuan to pay the hotel bill.

Exchange rates can sometimes change very swiftly. For example, in the United Kingdom the pound was worth about $1.50 just before the nation voted to leave the European Union (also known as the Brexit vote), but fell to $1.37 just after the vote and continued falling to reach 30-year lows a few months later. For firms engaged in international buying, selling, lending, and borrowing, these swings in exchange rates can have an enormous effect on profits.

This module discusses the international dimension of money, which involves conversions from one currency to another at an exchange rate. An exchange rate is nothing more than a price—that is, the price of one currency in terms of another currency—and so we can analyze it with the tools of supply and demand. First, we'll learn about foreign exchange markets: their size, their main participants, and the vocabulary for discussing movements of exchange rates. Next, we'll use demand and supply graphs to analyze some of the main factors that cause shifts in exchange rates. Finally, we'll bring the central bank and monetary policy back into the picture. Each country must decide whether to allow the market to determine its exchange rate, or have the central bank intervene. All the choices for exchange rate policy involve distinctive tradeoffs and risks.

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16.2: Introduction to the Foreign Exchange Market

What you'll learn to do: define currency exchange rates and explain how they influence trade balances



In the foreign exchange market, people and firms exchange one currency to purchase another currency. This market is influence by both demand and supply:

- The demand for dollars comes from those U.S. export firms seeking to convert their earnings in foreign currency back into U.S. dollars; foreign tourists converting their earnings in a foreign currency back into U.S. dollars; and foreign investors seeking to make financial investments in the U.S. economy.
- On the supply side of the foreign exchange market for the trading of U.S. dollars are foreign firms that have sold imports in the U.S. economy and are seeking to convert their earnings back to their home currency; U.S. tourists abroad; and U.S. investors seeking to make financial investments in foreign economies.

A stronger currency benefits those who are buying with that currency and injures those who are selling. In this section, you'll learn about why this is.

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16.3: The Foreign Exchange Market

Learning Objectives

- Explain the foreign exchange market and the main groups of people or firms who participate in the market
- Describe different types of investments like foreign direct investment (FDI), portfolio investment, and hedging

The Foreign Exchange Market

Most countries have their own currencies, but not all. Sometimes small economies use the currency of an economically larger neighbor. For example, Ecuador, El Salvador, and Panama have decided to **dollarize**—that is, to use the U.S. dollar as their currency. Sometimes nations share a common currency. The best example of a common currency is the Euro, a common currency used by 19 members of the European Union. With these exceptions duly noted, most international transactions require participants to convert from one currency to another when selling, buying, hiring, borrowing, traveling, or investing across national borders. The market in which people or firms use one currency to purchase another currency is called the **foreign exchange market**.

Try It

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Every **exchange rate** is a price—the price of one currency expressed in terms of units of another currency. The key framework for analyzing prices, whether in this course, any other economics course, in public policy, or business examples, is supply and demand in markets.

Watch It

Watch this video for a brief introduction to the foreign exchange market (or forex).

A link to an interactive elements can be found at the bottom of this page.

LINK IT UP

Visit this website for an exchange rate calculator.

The Extraordinary Size of the Foreign Exchange Markets

The quantities traded in foreign exchange markets are breathtaking. A survey done in April, 2013 by the Bank of International Settlements, an international organization for banks and the financial industry, found that $5.3 trillion *per day* was traded on foreign exchange markets, which makes the foreign exchange market the largest market in the world economy. In contrast, 2013 U.S. real GDP was $15.8 trillion *per year*.

Table 1 shows the currencies most commonly traded on foreign exchange markets. The foreign exchange market is dominated by the U.S. dollar, the Euro, the Japanese yen, and the British pound.

Table 1. Currencies Traded Most on Foreign Exchange Markets as of April, 2016 (Source: http://www.bis.org/publ/rpfx16fx.pdf)

Currency	% Daily Share
U.S. dollar	87.6%
Euro	31.3%
Japanese yen	21.6%
British pound	12.8%
Australian dollar	6.9%
Canadian dollar	5.1%
Swiss franc	4.8%
Chinese yuan	2.6%

Demanders and Suppliers of Currency in Foreign Exchange Markets

In foreign exchange markets, demand and supply become closely interrelated, because a person or firm who demands one currency must at the same time supply another currency—and vice versa. To get a sense of this, it is useful to consider four groups of people or firms who participate in the market: (1) firms that import or export goods and services; (2) tourists visiting other countries; (3) international investors buying ownership (or part-ownership) in a foreign firm; (4) international investors making financial investments that do not involve ownership. Let's consider these categories in turn.

Firms that sell exports or buy imports find that their costs for workers, suppliers, and investors are measured in the currency of the nation where their production occurs, but their revenues from sales are measured in the currency of the different nation where their sales happened. So, a Chinese firm exporting abroad will earn some other currency—say, U.S. dollars—but will need Chinese yuan to pay the workers, suppliers, and investors who are based in China. In the foreign exchange markets, this firm will be a supplier of U.S. dollars and a demander of Chinese yuan.

International tourists need foreign currency for expenses in the country they are visiting; they will supply their home currency to receive the foreign currency. For example, an American tourist who is visiting China will supply U.S. dollars into the foreign exchange market and demand Chinese yuan.

Financial investments that cross international boundaries, and require exchanging currency, are often divided into two categories. **Foreign direct investment (FDI)** refers to purchasing (at least ten percent) ownership in a firm in another country or starting up a new enterprise in a foreign country. For example, in 2008 the Belgian beer-brewing company InBev bought the U.S. beer-maker Anheuser-Busch for $52 billion. To make this purchase of a U.S. firm, InBev had to supply euros (the currency of Belgium) to the foreign exchange market and demand U.S. dollars.

The other kind of international financial investment, **portfolio investment**, involves a purely financial investment that does not entail any management responsibility. An example would be a U.S. financial investor who purchased bonds issued by the government of the United Kingdom, or deposited money in a British bank. To make such investments, the American investor would supply U.S. dollars in the foreign exchange market and demand British pounds.

Portfolio investment is often linked to expectations about how exchange rates will shift. Look at a U.S. financial investor who is considering purchasing bonds issued in the United Kingdom. For simplicity, ignore any interest paid by the bond (which will be small in the short run anyway) and focus on exchange rates. Say that a British pound is currently worth $1.50 in U.S. currency. However, the investor believes that in a month, the British pound will be worth $1.60 in U.S. currency. Thus, as Figure 2(a) shows, this investor would change $24,000 for 16,000 British pounds. In a month, if the pound is indeed worth $1.60, then the portfolio investor can trade back to U.S. dollars at the new exchange rate, and have $25,600—a nice profit. A portfolio investor who believes that the foreign exchange rate for the pound will work in the opposite direction can also invest accordingly. Say that an investor expects that the pound, now worth $1.50 in U.S. currency, will decline to $1.40. Then, as shown in Figure 2(b), that investor could start off with £20,000 in British currency (borrowing the money if necessary), convert it to $30,000 in U.S. currency, wait a month,

and then convert back to approximately £21,429 in British currency—again making a nice profit. Of course, this kind of investing comes without guarantees, and an investor may suffer losses if the exchange rates do not move as predicted.

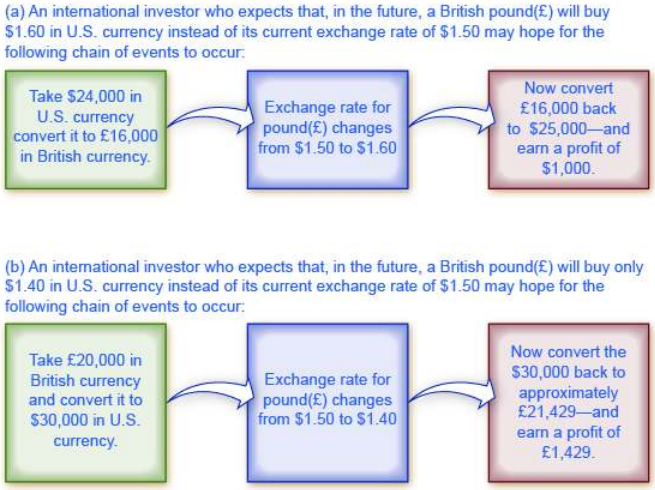


Figure 1.A Portfolio Investor Trying to Benefit from Exchange Rate Movements. Expectations of the future value of a currency can drive demand and supply of that currency in foreign exchange markets.

Many portfolio investment decisions are not as simple as betting that the value of the currency will change in one direction or the other. Instead, they involve firms trying to protect themselves from movements in exchange rates. Imagine you are running a U.S. firm that is exporting to France. You have signed a contract to deliver certain products and will receive 1 million euros a year from now. But you do not know how much this contract will be worth in U.S. dollars, because the dollar/euro exchange rate can fluctuate in the next year. Let's say you want to know for sure what the contract will be worth, and not take a risk that the euro will be worth less in U.S. dollars than it currently is. You can **hedge**, which means using a financial transaction to protect yourself against currency risk. Specifically, you can sign a financial contract and pay a fee that guarantees you a certain exchange rate one year from now—regardless of what the market exchange rate is at that time. Now, it is possible that the euro will be worth more in dollars a year from now, so your hedging contract will be unnecessary, and you will have paid a fee for nothing. But if the value of the euro in dollars declines, then you are protected by the hedge. Financial contracts like hedging, where parties wish to be protected against exchange rate movements, also commonly lead to a series of portfolio investments by the firm that is receiving a fee to provide the hedge.

Both foreign direct investment and portfolio investment involve an investor who supplies domestic currency and demands a foreign currency. With portfolio investment less than ten percent of a company is purchased. As such, portfolio investment is often made with a short term focus. With foreign direct investment more than ten percent of a company is purchased and the investor typically assumes some managerial responsibility; thus foreign direct investment tends to have a more long-run focus. As a practical matter, portfolio investments can be withdrawn from a country much more quickly than foreign direct investments. A U.S. portfolio investor who wants to buy or sell bonds issued by the government of the United Kingdom can do so with a phone call or a few clicks of a computer key. However, a U.S. firm that wants to buy or sell a company, such as one that manufactures automobile parts in the United Kingdom, will find that planning and carrying out the transaction takes a few weeks, even months. Table 2 summarizes the main categories of demanders and suppliers of currency.

Table 2. The Demand and Supply Line-ups in Foreign Exchange Markets

Demand for the U.S. Dollar Comes from…	Supply of the U.S. Dollar Comes from…
A U.S. exporting firm that earned foreign currency and is trying to pay U.S.-based expenses	A foreign firm that has sold imported goods in the United States, earned U.S. dollars, and is trying to pay expenses incurred in its home country
Foreign tourists visiting the United States	U.S. tourists leaving to visit other countries
Foreign investors who wish to make direct investments in the U.S. economy	U.S. investors who want to make foreign direct investments in other countries
Foreign investors who wish to make portfolio investments in the U.S. economy	U.S. investors who want to make portfolio investments in other countries

Try It

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Participants in the Exchange Rate Market

The foreign exchange market does not involve the ultimate suppliers and demanders of foreign exchange literally seeking each other out. If Martina decides to leave her home in Venezuela and take a trip in the United States, she does not need to find a U.S. citizen who is planning to take a vacation in Venezuela and arrange a person-to-person currency trade. Instead, the foreign exchange market works through financial institutions, and it operates on several levels.

Most people and firms who are exchanging a substantial quantity of currency go to a bank, and most banks provide foreign exchange as a service to customers. These banks (and a few other firms), known as dealers, then trade the foreign exchange. This is called the interbank market.

In the world economy, roughly 2,000 firms are foreign exchange dealers. The U.S. economy has less than 100 foreign exchange dealers, but the largest 12 or so dealers carry out more than half the total transactions. The foreign exchange market has no central location, but the major dealers keep a close watch on each other at all times.

The foreign exchange market is huge not because of the demands of tourists, firms, or even foreign direct investment, but instead because of portfolio investment and the actions of interlocking foreign exchange dealers. International tourism is a very large industry, involving about $1 trillion per year. Global exports are about 23% of global GDP; which is about $18 trillion per year. Foreign direct investment totaled about $1.4 trillion in 2012. These quantities are dwarfed, however, by the $5.3 trillion *per day* being traded in foreign exchange markets. Most transactions in the foreign exchange market are for portfolio investment—relatively short-term movements of financial capital between currencies—and because of the actions of the large foreign exchange dealers as they constantly buy and sell with each other.

Watch It

This video clip will give you an example of how money is exchanged on the foreign exchange market and how that affects international trade. We'll dig into some of the concepts in further detail in the readings that follow.

A link to an interactive elements can be found at the bottom of this page.

Learning Objectives

[glossary-page][glossary-term]dollarize:[/glossary-term]
[glossary-definition] a country that is not the United States uses the U.S. dollar as its currency[/glossary-definition]
[glossary-term]exchange rate: [/glossary-term]
[glossary-definition]the price of one currency expressed in terms of units of another currency[/glossary-definition]
[glossary-term]foreign direct investment (FDI):[/glossary-term]
[glossary-definition]purchasing more than ten percent of a firm or starting a new enterprise in another country[/glossary-definition][glossary-term]foreign exchange market:[/glossary-term]
[glossary-definition]the market in which people use one currency to buy another currency[/glossary-definition]
[glossary-term]hedge:[/glossary-term]
[glossary-definition]using a financial transaction as protection against risk[/glossary-definition][glossary-term]portfolio

investment:[/glossary-term]
[glossary-definition]an investment in another country that is purely financial and does not involve any management responsibility[/glossary-definition] [/glossary-page]

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16.4: Strengthening and Weakening Currency

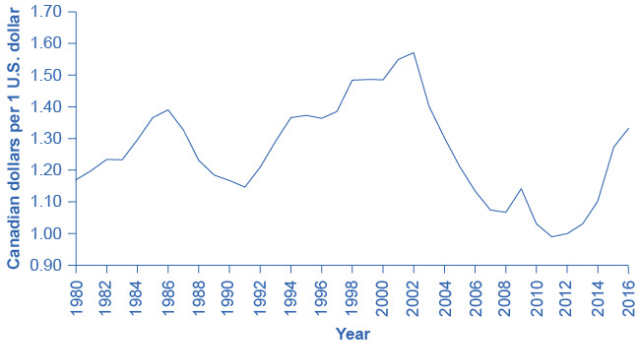
Learning Objectives

- Describe the exchange rate when a currency increases in value and a currency decreases in value
- Identify who benefits from a stronger currency and benefits from a weaker currency

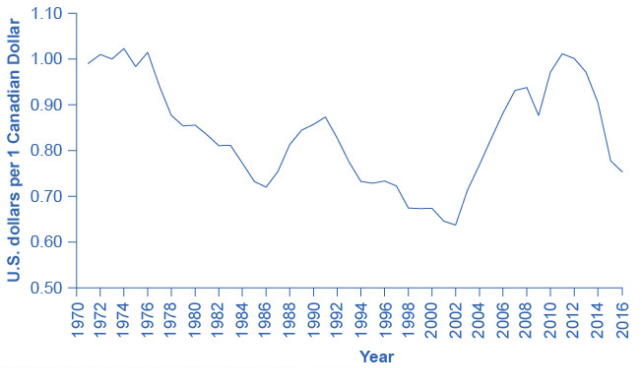
Strengthening and Weakening Currency

When the value of a currency rises, so that the currency exchanges for more of other currencies, the exchange rate is described as **appreciating** or "strengthening." When the value of a currency falls, so that a currency trades for less of other currencies, the exchange rate is described as **depreciating** or "weakening."

To illustrate the use of these terms, consider the exchange rate between the U.S. dollar and the Canadian dollar since 1980, in Figure 1(a). The vertical axis in Figure 1(a) shows the price of $1 in U.S. currency, measured in terms of Canadian currency. Clearly, exchange rates can move up and down substantially. A U.S. dollar traded for $1.17 Canadian in 1980. The U.S. dollar appreciated or strengthened to $1.39 Canadian in 1986, depreciated or weakened to $1.15 Canadian in 1991, and then appreciated or strengthened to $1.60 Canadian by early in 2002, fell to roughly $1.20 Canadian in 2009, and then had a sharp spike up and decline in 2009 and 2010. In May of 2017, the U.S. dollar stood at $1.36 Canadian. The units in which we measure exchange rates can be confusing, because we measure the exchange rate of the U.S. dollar exchange using a different currency—the Canadian dollar. However, exchange rates always measure the price (or value) of one unit of currency by using a different currency.



(a) U.S. dollar exchange rate in Canadian dollars



(b) Canadian dollar exchange rate in U.S. dollars

Figure 1. Exchange rates tend to fluctuate substantially, even between bordering countries such as the United States and Canada. By looking closely at the time values (the years vary slightly on these graphs), it is clear that the values in part (a) are a mirror image of part (b), which demonstrates that the depreciation of one currency correlates to the appreciation of the other and vice versa. This means that when comparing the exchange rates between two countries (in this case, the United States and Canada), the depreciation (or weakening) of one country (the U.S. dollar for this example) indicates the appreciation (or strengthening) of the other currency (which in this example is the Canadian dollar). (Source: Federal Reserve Economic Data (FRED) https://research.stlouisfed.org/fred2/series/EXCAUS)

In looking at the exchange rate between two currencies, the appreciation or strengthening of one currency must mean the depreciation or weakening of the other. Figure 1(b) shows the exchange rate for the Canadian dollar, measured in terms of U.S. dollars. The exchange rate of the U.S. dollar measured in Canadian dollars, shown in Figure 1(a), is a perfect mirror image with the exchange rate of the Canadian dollar measured in U.S. dollars, shown in Figure 15(b). A fall in the Canada $/U.S. $ ratio means a rise in the U.S. $/Canada $ ratio, and vice versa.

Try It

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https://assessments.lumenlearning.co...sessments/7696

https://assessments.lumenlearning.co...sessments/7697

Watch It

This video explains how the exchange rate is determined using supply and demand.

A link to an interactive elements can be found at the bottom of this page.

With the price of a typical good or service, it is clear that higher prices benefit sellers and hurt buyers, while lower prices benefit buyers and hurt sellers. In the case of exchange rates, where the buyers and sellers are not always intuitively obvious, it is useful to trace through how different participants in the market will be affected by a stronger or weaker currency. Consider, for example, the impact of a stronger U.S. dollar on six different groups of economic actors, as shown in Figure 2: (1) U.S. exporters selling abroad; (2) foreign exporters (that is, firms selling imports in the U.S. economy); (3) U.S. tourists abroad; (4) foreign tourists visiting the United States; (5) U.S. investors (either foreign direct investment or portfolio investment) considering opportunities in other countries; (6) and foreign investors considering opportunities in the U.S. economy.



Figure 2.How Do Exchange Rate Movements Affect Each Group? Exchange rate movements affect exporters, tourists, and international investors in different ways.

For a U.S. firm selling abroad, a stronger U.S. dollar is a curse. A strong U.S. dollar means that foreign currencies are correspondingly weak. When this exporting firm earns foreign currencies through its export sales, and then converts them back to U.S. dollars to pay workers, suppliers, and investors, the stronger dollar means that the foreign currency buys fewer U.S. dollars than if the currency had not strengthened, and that the firm's profits (as measured in dollars) fall. As a result, the firm may choose to reduce its exports, or it may raise its selling price, which will also tend to reduce its exports. In this way, a stronger currency reduces a country's exports.

Conversely, for a foreign firm selling in the U.S. economy, a stronger dollar is a blessing. Each dollar earned through export sales, when traded back into the home currency of the exporting firm, will now buy more of the home currency than expected before the dollar had strengthened. As a result, the stronger dollar means that the importing firm will earn higher profits than expected. The firm will seek to expand its sales in the U.S. economy, or it may reduce prices, which will also lead to expanded sales. In this way, a stronger U.S. dollar means that consumers will purchase more from foreign producers, expanding the country's level of imports.

For a U.S. tourist abroad, who is exchanging U.S. dollars for foreign currency as necessary, a stronger U.S. dollar is a benefit. The tourist receives more foreign currency for each U.S. dollar, and consequently the cost of the trip in U.S. dollars is lower. When a country's currency is strong, it is a good time for citizens of that country to tour abroad. Imagine a U.S. tourist who has saved up $5,000 for a trip to South Africa. In January 2008, $1 bought 7 South African rand, so the tourist had 35,000 rand to spend. In January 2009, $1 bought 10 rand, so the tourist had 50,000 rand to spend. By January 2010, $1 bought only 7.5 rand. Clearly, 2009 was the year for U.S. tourists to visit South Africa. For foreign visitors to the United States, the opposite pattern holds true. A relatively stronger U.S. dollar means that their own currencies are relatively weaker, so that as they shift from their own currency to U.S. dollars, they have fewer U.S. dollars than previously. When a country's currency is strong, it is not an especially good time for foreign tourists to visit.

A stronger dollar injures the prospects of a U.S. financial investor who has already invested money in another country. A U.S. financial investor abroad must first convert U.S. dollars to a foreign currency, invest in a foreign country, and then later convert that foreign currency back to U.S. dollars. If in the meantime the U.S. dollar becomes stronger and the foreign currency becomes weaker, then when the investor converts back to U.S. dollars, the rate of return on that investment will be less than originally expected at the time it was made.

However, a stronger U.S. dollar boosts the returns of a foreign investor putting money into a U.S. investment. That foreign investor converts from the home currency to U.S. dollars and seeks a U.S. investment, while later planning to switch back to the home currency. If, in the meantime, the dollar grows stronger, then when the time comes to convert from U.S. dollars back to the foreign currency, the investor will receive more foreign currency than expected at the time the original investment was made.

The preceding paragraphs all focus on the case where the U.S. dollar becomes stronger. The corresponding happy or unhappy economic reactions are illustrated in the first column of Figure 2. The following feature centers the analysis on the opposite: a weaker dollar.

EFFECTS OF A WEAKER DOLLAR

Let's examine the effects of a weaker dollar in various scenarios.

Scenario 1: What will happen to the price of a Ford pickup truck in the U.K. if the value of the dollar weakens?

First, we note that the demand for U.S. exports is a function of the price of those exports, which depends on the dollar price of those goods and the exchange rate of the dollar in terms of foreign currency. For example, a Ford pickup truck costs $25,000 in the United States. When it is sold in the United Kingdom, the price is $25,000/$1.50 per British pound, or £16,667. The dollar affects the price faced by foreigners who may purchase U.S. exports.

Next, consider that, if the dollar weakens, the pound rises in value. If the pound rises to $2.00 per pound, then the price of a Ford pickup is now $25,000/$2.00 = £12,500. A weaker dollar means the foreign currency buys more dollars, which means that U.S. exports appear less expensive.

From this, we conclude that a weaker U.S. dollar leads to an increase in U.S. exports. For a foreign exporter, the outcome is just the opposite.

Scenario 2: How does a depreciating dollar affect the exchange of British beer in the United States?

Suppose a brewery in England is interested in selling its Bass Ale to a grocery store in the United States. If the price of a six pack of Bass Ale is £6.00 and the exchange rate is $1.50 per British pound, the price for the grocery store is 6.00 × $1.50 = $9.00 per six pack. If the dollar weakens to $2.00 per pound, the price of Bass Ale is now 6.00 × $2.00 = $12.

We can conclude that from the perspective of U.S. purchasers, a weaker dollar means that foreign currency is more expensive, which means that foreign goods are more expensive also. This leads to a decrease in U.S. imports, which is bad for the foreign exporter.

Scenario 3: **How does a weaker dollar affect U.S. tourists traveling abroad?**

U.S. tourists going abroad face the same situation as a U.S. importer—they are purchasing a foreign trip. A weaker dollar means that their trip will cost more, since a given expenditure of foreign currency (e.g., hotel bill) will take more dollars. The result is that the tourist may not stay as long abroad, and some may choose not to travel at all.

Scenario 4: How does a weaker dollar affect foreign tourists traveling to the United States?

Consider that, for the foreign tourist to the United States, a weaker dollar is a boon. It means their currency goes further, so the cost of a trip to the United States will be less. Foreigners may choose to take longer trips to the United States, and more foreign tourists may decide to take U.S. trips.

Scenario 5: How does a weaker dollar affect investments?

A U.S. investor abroad faces the same situation as a U.S. importer—they are purchasing a foreign asset. A U.S. investor will see a weaker dollar as an increase in the "price" of investment, since the same number of dollars will buy less foreign currency and thus less foreign assets. This should decrease the amount of U.S. investment abroad.

Foreign investors in the Unites States will have the opposite experience. Since foreign currency buys more dollars, they will likely invest in more U.S. assets.

At this point, you should have a good sense of the major players in the foreign exchange market: firms involved in international trade, tourists, international financial investors, banks, and foreign exchange dealers. The next section demonstrates in more detail how the tools of demand and supply can be used in foreign exchange markets to explain the underlying causes of stronger and weaker currencies.

Try It

One common misunderstanding about exchange rates is that a "stronger" or "appreciating" currency must be better than a "weaker" or "depreciating" currency. After all, is it not obvious that "strong" is better than "weak"? But do not let the terminology confuse you. When a currency becomes stronger, so that it purchases more of other currencies, it benefits some in the economy and injures others. Stronger currency is not necessarily better, it is just different.

Try It

https://assessments.lumenlearning.co...sessments/7698

Watch It

Watch this video to practice analyzing the impact of shifters on supply and demand in the foreign exchange market.

A link to an interactive elements can be found at the bottom of this page.

Try It

These questions allow you to get as much practice as you need, as you can click the link at the top of the first question ("Try another version of these questions") to get a new set of questions. Practice until you feel comfortable doing the questions.

[ohm_question]154281-154286-154288-154292-154320[/ohm_question]

Learning Objectives

[glossary-page][glossary-term]appreciating:[/glossary-term]
[glossary-definition]when a currency is worth more in terms of other currencies; also called "strengthening"[/glossary-definition][glossary-term]depreciating:[/glossary-term]
[glossary-definition]when a currency is worth less in terms of other currencies; also called "weakening"[/glossary-definition][/glossary-page]

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16.5: Introduction to Exchange Rates and Purchasing Power

What you'll learn to do: analyze how supply and demand affects currencies and exchange rates



Have you ever considered traveling abroad to a country where you can get more bank for your buck? Maybe you could stock up on clothes, movies, or just enjoy paying less for food? Why do you think that happens? In this section, you'll learn about how variations in supply and demand between foreign currencies affect the purchasing power of your money.

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16.6: Demand and Supply Shifts in Foreign Exchange Markets

Learning Objectives

- Explain the factors that cause the demand and supply of foreign currencies to shift
- Define arbitrage and the importance of purchasing power parity

Demand and Supply Shifts in Foreign Exchange Markets

The foreign exchange market involves firms, households, and investors who purchase foreign goods, services and assets (or who sell goods, services and assets to foreigners). As a result, they demand (or supply) foreign currencies in order to complete their transactions. For example, households buy imported goods for which they need foreign currency to pay for them. Similarly, wealthy individuals or businesses make investments in foreign countries for which they need foreign currency also.

Exchange rates are the prices of foreign currencies, which are determined in their respective foreign currency markets. A variety of factors can influence these exchange rates, including the amounts of imports and exports, GDP, market expectations, and inflation. For example, if the GDP falls in one nation, that nation is likely to import less. If GDP grows, it will import more. Everything else held constant, these fluctuations also cause a shift in foreign exchange markets. For example, if the U.S. goes into a recession, then GDP falls and they would import less from Mexico. Thus, the demand for Mexican pesos decreases and the U.S. dollar falls relative to the Mexican peso. In other words, the peso gains value.

Figure 1(a) offers an example for the exchange rate between the U.S. dollar and the Mexican peso. The vertical axis shows the exchange rate for U.S. dollars, which in this case is measured in pesos. The horizontal axis shows the quantity of U.S. dollars being traded in the foreign exchange market each day. The demand curve (D) for U.S. dollars intersects with the supply curve (S) of U.S. dollars at the equilibrium point (E), which is an exchange rate of 10 pesos per dollar and a total volume of $8.5 billion.

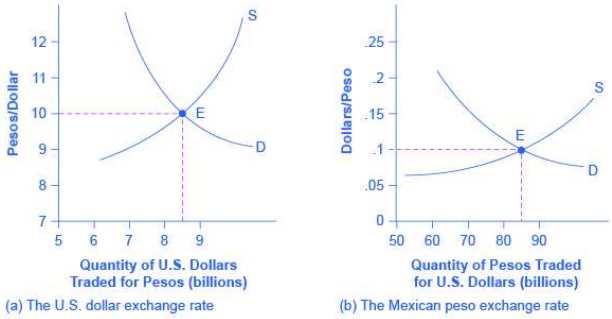


Figure 1.Demand and Supply for the U.S. Dollar and Mexican Peso Exchange Rate. (a) The quantity measured on the horizontal axis is in U.S. dollars, and the exchange rate on the vertical axis is the price of U.S. dollars measured in Mexican pesos. (b) The quantity measured on the horizontal axis is in Mexican pesos, while the price on the vertical axis is the price of pesos measured in U.S. dollars. In both graphs, the equilibrium exchange rate occurs at point E, at the intersection of the demand curve (D) and the supply curve (S).

Figure 1(b) presents the same demand and supply information from the perspective of the Mexican peso. The vertical axis shows the exchange rate for Mexican pesos, which is measured in U.S. dollars. The horizontal axis shows the quantity of Mexican pesos traded in the foreign exchange market. The demand curve (D) for Mexican pesos intersects with the supply curve (S) of Mexican pesos at the equilibrium point (E), which is an exchange rate of 10 cents in U.S. currency for each Mexican peso and a total volume of 85 billion pesos. Note that the two exchange rates are inverses: 10 pesos per dollar is the same as 10 cents per peso (or $0.10 per peso). In the actual foreign exchange market, almost all of the trading for Mexican pesos is done for U.S. dollars. What factors would cause the demand or supply to shift, thus leading to a change in the equilibrium exchange rate? Read on to discover the answer to this question.

Try It

https://assessments.lumenlearning.co...sessments/7699

Expectations about Future Exchange Rates

One reason to demand a currency on the foreign exchange market is the belief that the value of the currency is about to increase. One reason to supply a currency—that is, sell it on the foreign exchange market—is the expectation that the value of the currency is about to decline. For example, imagine that a leading business newspaper, like the *Wall Street Journal* or the *Financial Times*, runs an article predicting that the Mexican peso will appreciate in value. The likely effects of such an article are illustrated in the interactive graph below (Figure 2). Demand for the Mexican peso shifts to the right, from D_0 to D_1, as investors become eager to purchase pesos. Conversely, the supply of pesos shifts to the left, from S_0 to S_1, because investors will be less willing to give them up. The result is that the equilibrium exchange rate rises from 10 cents/peso to 12 cents/peso and the equilibrium exchange rate rises from 85 billion to 90 billion pesos as the equilibrium moves from E_0 to E_1.

A link to an interactive elements can be found at the bottom of this page.

Figure 2 (Interactive Graph). Exchange Rate Market for Mexican Peso Reacts to Expectations about Future Exchange Rates.

Figure 2 also illustrates some peculiar traits of supply and demand diagrams in the foreign exchange market. In contrast to all the other cases of supply and demand you have considered, in the foreign exchange market, supply and demand typically both move at the same time. Groups of participants in the foreign exchange market like firms and investors include some who are buyers and some who are sellers. An expectation of a future shift in the exchange rate affects both buyers and sellers—that is, it affects both demand and supply for a currency.

The shifts in demand and supply curves both cause the exchange rate to shift in the same direction; in this example, they both make the peso exchange rate stronger. However, the shifts in demand and supply work in opposing directions on the quantity traded. In this example, the rising demand for pesos is causing the quantity to rise while the falling supply of pesos is causing quantity to fall. In this specific example, the result is a higher quantity. But in other cases, the result could be that quantity remains unchanged or declines.

This example also helps to explain why exchange rates often move quite substantially in a short period of a few weeks or months. When investors expect a country's currency to strengthen in the future, they buy the currency and cause it to appreciate immediately. The appreciation of the currency can lead other investors to believe that future appreciation is likely—and thus lead to even further appreciation. Similarly, a fear that a currency *might* weaken quickly leads to an *actual* weakening of the currency, which often reinforces the belief that the currency is going to weaken further. Thus, beliefs about the future path of exchange rates can be self-reinforcing, at least for a time, and a large share of the trading in foreign exchange markets involves dealers trying to outguess each other on what direction exchange rates will move next.

Differences across Countries in Rates of Return

The motivation for investment, whether domestic or foreign, is to earn a return. If rates of return in a country look relatively high, then that country will tend to attract funds from abroad. Conversely, if rates of return in a country look relatively low, then funds will tend to flee to other economies. Changes in the expected rate of return will shift demand and supply for a currency. For example, imagine that interest rates rise in the United States as compared with Mexico. Thus, financial investments in the United States promise a higher return than they previously did. As a result, more investors will demand U.S. dollars so that they can buy interest-bearing assets and fewer investors will be willing to supply U.S. dollars to foreign exchange markets. Demand for the U.S. dollar will shift to the right, from D_0 to D_1, and supply will shift to the left, from S_0 to S_1, as shown in the interactive graph below (Figure 3). The new equilibrium (E_1), will occur at an exchange rate of nine pesos/dollar and the same quantity of $8.5 billion. Thus, a higher interest rate or rate of return relative to other countries leads a nation's currency to appreciate or strengthen, and a lower interest rate relative to other countries leads a nation's currency to depreciate or weaken. Since a nation's central bank can use monetary policy to affect its interest rates, a central bank can also cause changes in exchange rates.

An interactive or media element has been excluded from this version of the text. You can view it online here: http://pb.libretexts.org/mlum/?p=671

Figure 3 (Interactive Graph). Exchange Rate Market for U.S. Dollars Reacts to Higher Interest Rates.

Relative Inflation

If a country experiences a relatively high inflation rate compared with other economies, then the buying power of its currency is eroding, which will tend to discourage anyone from wanting to acquire or to hold the currency. Figure 4 (the interactive graph below) shows an example based on an actual episode concerning the Mexican peso. In 1986–87, Mexico experienced an inflation rate of over 200%. Not surprisingly, as inflation dramatically decreased the purchasing power of the peso in Mexico, the exchange rate value of the peso declined as well. As shown in Figure 4, demand for the peso on foreign exchange markets decreased from D_0 to D_1, while supply of the peso increased from S_0 to S_1. The equilibrium exchange rate fell from $2.50 per peso at the original equilibrium (E_0) to $0.50 per peso at the new equilibrium (E_1). In this example, the quantity of pesos traded on foreign exchange markets remained the same, even as the exchange rate shifted.

A link to an interactive elements can be found at the bottom of this page.

Figure 4 (Interactive Graph). Exchange Rate Markets React to Higher Inflation.

Purchasing Power Parity

Over the long term, exchange rates must bear some relationship to the buying power of the currency in terms of goods that are internationally traded. If at a certain exchange rate it was much cheaper to buy internationally traded goods—such as oil, steel, computers, and cars—in one country than in another country, businesses would start buying in the cheap country, selling in other countries, and pocketing the profits.

For example, if a U.S. dollar is worth $1.60 in Canadian currency, then a car that sells for $20,000 in the United States should sell for $32,000 in Canada. If the price of cars in Canada was much lower than $32,000, then at least some U.S. car-buyers would convert their U.S. dollars to Canadian dollars and buy their cars in Canada. If the price of cars was much higher than $32,000 in this example, then at least some Canadian buyers would convert their Canadian dollars to U.S. dollars and go to the United States to purchase their cars. This is known as **arbitrage**, the process of buying and selling goods or currencies across international borders at a profit. It may occur slowly, but over time, it will force prices and exchange rates to align so that the price of internationally traded goods is similar in all countries.

The exchange rate that equalizes the prices of internationally traded goods across countries is called the **purchasing power parity (PPP)** exchange rate. A group of economists at the International Comparison Program, run by the World Bank, have calculated the PPP exchange rate for all countries, based on detailed studies of the prices and quantities of internationally tradable goods.

Watch It

In this video, Alex shows you an example of purchasing power parity while on a trip to India.

A link to an interactive elements can be found at the bottom of this page.

The purchasing power parity exchange rate has two functions. First, PPP exchange rates are often used for international comparison of GDP and other economic statistics. Imagine that you are preparing a table showing the size of GDP in many countries in several recent years, and for ease of comparison, you are converting all the values into U.S. dollars. When you insert the value for Japan, you need to use a yen/dollar exchange rate. But should you use the market exchange rate or the PPP exchange rate? Market exchange rates bounce around. In summer 2008, the exchange rate was 108 yen/dollar, but in late 2009 the U.S. dollar exchange rate versus the yen was 90 yen/dollar. For simplicity, say that Japan's GDP was ¥500 trillion in both 2008 and 2009. If you use the market exchange rates, then Japan's GDP will be $4.6 trillion in 2008 (that is, ¥500 trillion /(¥108/dollar)) and $5.5 trillion in 2009 (that is, ¥500 trillion /(¥90/dollar)).

Of course, it is not true that Japan's economy increased enormously in 2009—in fact, Japan had a recession like much of the rest of the world. The misleading appearance of a booming Japanese economy occurs only because we used the market exchange rate, which often has short-run rises and falls. However, PPP exchange rates stay fairly constant and change only modestly, if at all, from year to year.

The second function of PPP is that exchanges rates will often get closer and closer to it as time passes. It is true that in the short run and medium run, as exchange rates adjust to relative inflation rates, rates of return, and to expectations about how interest rates and inflation will shift, the exchange rates will often move away from the PPP exchange rate for a time. But, knowing the PPP will allow you to track and predict exchange rate relationships.

Food For Thought

One interesting way to think about purchasing power parity is by comparing the price of a hamburger across different countries. Initially just for fun, The Economist began comparing the price of a BigMac in the BigMac Index between various countries in 1986, and continues to do so today as a simple way to see how currency may be either undervalued or overvalued.

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https://assessments.lumenlearning.co...sessments/7701

Try It

[ohm_question]154321-154323-154324-154326-154327-154328-154329[/ohm_question]

Learning Objectives

[glossary-page][glossary-term]arbitrage: [/glossary-term]
[glossary-definition]the process of buying a good and selling goods across borders to take advantage of international price differences[/glossary-definition][glossary-term]purchasing power parity (PPP):[/glossary-term]
[glossary-definition]the exchange rate that equalizes the prices of internationally traded goods across countries[/glossary-definition]
[/glossary-page]

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16.7: Introduction to Exchange Rates and the Trade Balance

What you'll learn to do: explain how the balance of trade (surplus or deficit) affects the domestic economy



In this section, you will learn how fluctuations in exchange rates affect imports and exports, and how changes in imports and exports affect the domestic economy.

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16.8: Macroeconomic Effects of Exchange Rates

Learning Objectives

- Explain how changes in exchange rates influence aggregate demand and supply

Exchange Rates, Aggregate Demand, and Aggregate Supply

A central bank will be concerned about the exchange rate for three reasons: (1) Movements in the exchange rate will affect the quantity of aggregate demand in an economy; (2) frequent substantial fluctuations in the exchange rate can disrupt international trade and cause problems in a nation's banking system; (3) the exchange rate may contribute to an unsustainable balance of trade and large inflows of international financial capital, which can set the economy up for a deep recession if international investors decide to move their money to another country. Let's discuss these scenarios in turn.

Foreign trade in goods and services typically involves incurring the costs of production in one currency while receiving revenues from sales in another currency. As a result, movements in exchange rates can have a powerful effect on incentives to export and import, and thus on aggregate demand in the economy as a whole.

For example, in 1999, when the euro first became a currency, its value measured in U.S. currency was $1.06/euro. By the end of 2013, the euro had risen (and the U.S. dollar had correspondingly weakened) to $1.37/euro. Consider the situation of a French firm that each year incurs €10 million in costs, and sells its products in the United States for $10 million. In 1999, when this firm converted $10 million back to euros at the exchange rate of $1.06/euro (that is, $10 million × [€1/$1.06]), it received €9.4 million, and suffered a loss. In 2013, when this same firm converted $10 million back to euros at the exchange rate of $1.37/euro (that is, $10 million × [€1 euro/$1.37]), it received approximately €7.3 million and an even larger loss. This example shows how a stronger euro discourages exports by the French firm, because it makes the costs of production in the domestic currency higher relative to the sales revenues earned in another country. From the point of view of the U.S. economy, the example also shows how a weaker U.S. dollar encourages exports.

Since an increase in exports results in more dollars flowing into the economy, and an increase in imports means more dollars are flowing out, it is easy to conclude that exports are "good" for the economy and imports are "bad," but this overlooks the role of exchange rates. If an American consumer buys a Japanese car for $20,000 instead of an American car for $30,000, it may be tempting to argue that the American economy has lost out. However, the Japanese company will have to convert those dollars to yen to pay its workers and operate its factories. Whoever buys those dollars will have to use them to purchase American goods and services, so the money comes right back into the American economy. At the same time, the consumer saves money by buying a less expensive import, and can use the extra money for other purposes.

Watch It

This video reviews some of the concepts you've already learned about the foreign exchange market and also provides a good example of how the appreciation or depreciation of money impacts imports and exports.

An interactive or media element has been excluded from this version of the text. You can view it online here: http://pb.libretexts.org/mlum/?p=675

Fluctuations in Exchange Rates

Exchange rates can fluctuate a great deal in the short run. From February 2008 to March 2009, the Indian rupee moved from 39 rupees/dollar ito 51 rupees/dollar, a decline of more than one-fourth in the value of the rupee on foreign exchange markets. We read earlier that even two economically developed neighboring economies like the United States and Canada can see significant movements in exchange rates over a few years. For firms that depend on export sales, or firms that rely on imported inputs to production, or even purely domestic firms that compete with firms tied into international trade—which in many countries adds up to half or more of a nation's GDP—sharp movements in exchange rates can lead to dramatic changes in profits and losses. So, a central bank may desire to keep exchange rates from moving too much as part of providing a stable business climate, where firms can focus on productivity and innovation, not on reacting to exchange rate fluctuations.

One of the most economically destructive effects of exchange rate fluctuations can happen through the banking system. Most international loans are measured in a few large currencies, like U.S. dollars, European euros, and Japanese yen. In countries that do

not use these currencies, banks often borrow funds in the currencies of other countries, like U.S. dollars, but then lend in their own domestic currency. The left-hand chain of events in Figure 1 shows how this pattern of international borrowing can work. A bank in Thailand borrows one million U.S. dollars. Then the bank converts the dollars to its domestic currency—in the case of Thailand, the currency is the baht—at a rate of 40 baht/dollar. The bank then lends the baht to a firm in Thailand. The business repays the loan in baht, and the bank converts it back to U.S. dollars to pay off its original U.S. dollar loan.

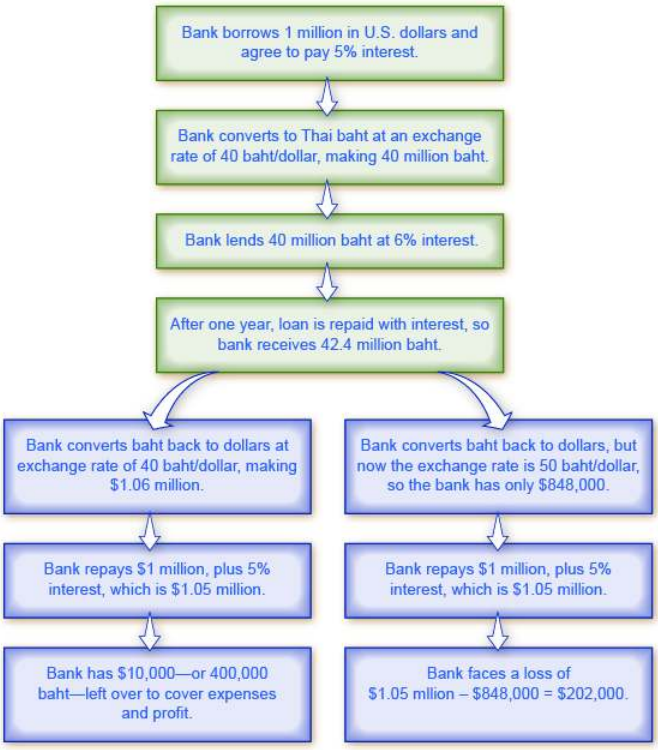


Figure 1.International Borrowing. The scenario of international borrowing that ends on the left is a success story, but the scenario that ends on the right shows what happens when the exchange rate weakens.

This process of borrowing in a foreign currency and lending in a domestic currency can work just fine, as long as the exchange rate does not shift. In the scenario outlined, if the dollar strengthens and the baht weakens, a problem arises. The right-hand chain of events in Figure 1 illustrates what happens when the baht unexpectedly weakens from 40 baht/dollar to 50 baht/dollar. The Thai firm still repays the loan in full to the bank. But because of the shift in the exchange rate, the bank cannot repay its loan in U.S. dollars. (Of course, if the exchange rate had changed in the other direction, making the Thai currency stronger, the bank could have realized an unexpectedly large profit.)

In 1997–1998, countries across eastern Asia, like Thailand, Korea, Malaysia, and Indonesia, experienced a sharp depreciation of their currencies, in some cases 50% or more. These countries had been experiencing substantial inflows of foreign investment capital, with bank lending increasing by 20% to 30% per year through the mid-1990s. When their exchange rates depreciated, the banking systems in these countries became bankrupt. Argentina experienced a similar chain of events in 2002. When the Argentine peso depreciated, Argentina's banks found themselves unable to pay back what they had borrowed in U.S. dollars.

Banks play a vital role in any economy in facilitating transactions and in making loans to firms and consumers. When most of a country's largest banks become bankrupt simultaneously, a sharp decline in aggregate demand and a deep recession results. Since the main responsibilities of a central bank are to control the money supply and to ensure that the banking system is stable, a central bank must be concerned about whether large and unexpected exchange rate depreciation will drive most of the country's existing banks into bankruptcy.

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16.9: Exchange-Rate Policies

Learning Objectives

- Differentiate among a floating exchange rate, a soft peg, a hard peg, and a merged currency
- Identify the tradeoffs that come with a floating exchange rate, a soft peg, a hard peg, and a merged currency

Exchange-Rate Policies

Because changes in exchange rates have macroeconomic effects on a nation's economy, nations need to think about what exchange rate policy they should adopt. Exchange rate policies come in a range of different forms listed in Figure 1: let the foreign exchange market determine the exchange rate; let the market set the value of the exchange rate most of the time, but have the central bank sometimes intervene to prevent fluctuations that seem too large; have the central bank guarantee a specific exchange rate; or share a currency with other countries. Let's discuss each type of exchange rate policy and its tradeoffs.



Figure 1.A Spectrum of Exchange Rate Policies. A nation may adopt one of a variety of exchange rate regimes, from floating rates in which the foreign exchange market determines the rates to pegged rates where governments intervene to manage the value of the exchange rate, to a common currency where the nation adopts the currency of another country or group of countries.

Floating Exchange Rates

A policy which allows the foreign exchange market to set exchange rates is referred to as a **floating exchange rate**. The U.S. dollar is a floating exchange rate, as are the currencies of about 40% of the countries in the world economy. The major concern with this policy is that exchange rates can move a great deal in a short time.

Consider the U.S. exchange rate expressed in terms of another fairly stable currency, the Japanese yen, as Figure 2 shows. On January 1, 2002, the exchange rate was 133 yen/dollar. On January 1, 2005, it was 103 yen/dollar. On June 1, 2007, it was 122 yen/dollar, on January 1, 2012, it was 77 yen per dollar, and on March 1, 2015, it was 120 yen per dollar. As investor sentiment swings back and forth, driving exchange rates up and down, exporters, importers, and banks involved in international lending are all affected. At worst, large movements in exchange rates can drive companies into bankruptcy or trigger a nationwide banking collapse. However, even in the moderate case of the yen/dollar exchange rate, these movements of roughly 30 percent back and forth impose stress on both economies as firms must alter their export and import plans to take the new exchange rates into account. Especially in smaller countries where international trade is a relatively large share of GDP, exchange rate movements can rattle their economies.



Figure 2. U.S. Dollar Exchange Rate in Japanese Yen. Even seemingly stable exchange rates such as the Japanese Yen to the U.S. Dollar can vary when closely examined over time. This figure shows a relatively stable rate between 2011 and 2013. In 2013, there was a drastic depreciation of the Yen (relative to the U.S. Dollar) by about 14% and again at the end of the year in 2014 also by about 14%. (Source: Federal Reserve Economic Data (FRED) https://research.stlouisfed.org/fred2/series/DEXJPUS)

However, movements of floating exchange rates have advantages, too. After all, prices of goods and services rise and fall throughout a market economy, as demand and supply shift. If an economy experiences strong inflows or outflows of international financial capital, or has relatively high inflation, or if it experiences strong productivity growth so that purchasing power changes relative to other economies, then it makes economic sense for the exchange rate to shift as well.

Floating exchange rate advocates often argue that if government policies were more predictable and stable, then inflation rates and interest rates would be more predictable and stable. Exchange rates would bounce around less, too. The Nobel prize winning economist Milton Friedman (1912–2006), for example, wrote a defense of floating exchange rates in 1962 in his book *Capitalism and Freedom*:

Being in favor of floating exchange rates does not mean being in favor of unstable exchange rates. When we support a free price system [for goods and services] at home, this does not imply that we favor a system in which prices fluctuate wildly up and down. What we want is a system in which prices are free to fluctuate but in which the forces determining them are sufficiently stable so that in fact prices move within moderate ranges. This is equally true in a system of floating exchange rates. The ultimate objective is a world in which exchange rates, while free to vary, are, in fact, highly stable because basic economic policies and conditions are stable.

Advocates of floating exchange rates admit that, yes, exchange rates may sometimes fluctuate. They point out, however, that if a central bank focuses on preventing either high inflation or deep recession, with low and reasonably steady interest rates, then exchange rates will have less reason to vary.

Using Soft Pegs and Hard Pegs

When a government intervenes in the foreign exchange market so that the exchange rate of its currency is different from what the market would have produced, it is said to have established a "peg" for its currency. A **soft peg** is the name for an exchange rate policy where the government usually allows the exchange rate to be set by the market, but in some cases, especially if the exchange rate seems to be moving rapidly in one direction, the central bank will intervene in the market. With a **hard peg** exchange rate policy, the central bank sets a fixed and unchanging value for the exchange rate. A central bank can implement soft peg and hard peg policies.

Suppose the market exchange rate for the Brazilian currency, the real, would be 35 cents/real with a daily quantity of 15 billion real traded in the market, as shown at the equilibrium E_0 in Figure 1(a) and Figure 1(b). However, the government of Brazil decides that the exchange rate should be 30 cents/real, as shown in Figure 1(a). Perhaps Brazil sets this lower exchange rate to benefit its export industries. Perhaps it is an attempt to stimulate aggregate demand by stimulating exports. Perhaps Brazil believes that the current market exchange rate is higher than the long-term purchasing power parity value of the real, so it is minimizing fluctuations in the real by keeping it at this lower rate. Perhaps the target exchange rate was set sometime in the past, and is now being maintained for the sake of stability. Whatever the reason, if Brazil's central bank wishes to keep the exchange rate below the market level, it must face the reality that at this weaker exchange rate of 30 cents/real, the quantity demanded of its currency at 17 billion reals is greater than the quantity supplied of 13 billion reals in the foreign exchange market.

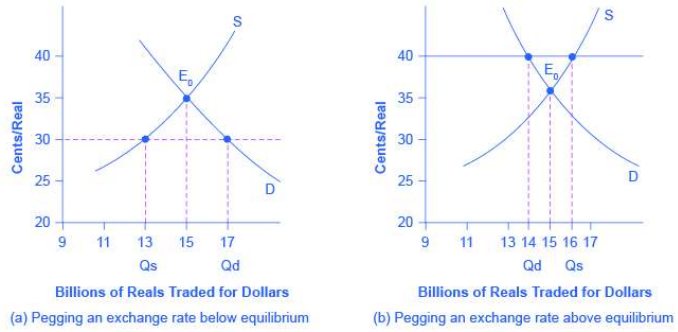


Figure 3.Pegging an Exchange Rate. (a) If an exchange rate is pegged below what would otherwise be the equilibrium, then the quantity demanded of the currency will exceed the quantity supplied. (b) If an exchange rate is pegged above what would otherwise be the equilibrium, then the quantity supplied of the currency exceeds the quantity demanded.

The Brazilian central bank could weaken its exchange rate in two ways. One approach is to use an expansionary monetary policy that leads to lower interest rates. In foreign exchange markets, the lower interest rates will reduce demand and increase supply of the real and lead to depreciation. This technique is not often used because lowering interest rates to weaken the currency may be in conflict with the country's monetary policy goals. Alternatively, Brazil's central bank could trade directly in the foreign exchange market. The central bank can expand the money supply by creating reals, use the reals to purchase foreign currencies, and avoid selling any of its own currency. In this way, it can fill the gap between quantity demanded and quantity supplied of its currency.

Figure 3(b) shows the opposite situation. Here, the Brazilian government desires a stronger exchange rate of 40 cents/real than the market rate of 35 cents/real. Perhaps Brazil desires the stronger currency to reduce aggregate demand and to fight inflation, or perhaps Brazil believes that that current market exchange rate is temporarily lower than the long-term rate. Whatever the reason, at the higher desired exchange rate, the quantity supplied of 16 billion reals exceeds the quantity demanded of 14 billion reals.

Brazil's central bank can use a contractionary monetary policy to raise interest rates, which will increase demand and reduce supply of the currency on foreign exchange markets, and lead to an appreciation. Alternatively, Brazil's central bank can trade directly in the foreign exchange market. In this case, with an excess supply of its own currency in foreign exchange markets, the central bank must use reserves of foreign currency, like U.S. dollars, to demand its own currency and thus cause an appreciation of its exchange rate.

Both a soft peg and a hard peg policy require that the central bank intervene in the foreign exchange market. However, a hard peg policy attempts to preserve a fixed exchange rate at all times. A soft peg policy typically allows the exchange rate to move up and down by relatively small amounts in

the short run of several months or a year, and to move by larger amounts over time, but seeks to avoid extreme short-term fluctuations.

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Tradeoffs of Soft Pegs and Hard Pegs

When a country decides to alter the market exchange rate, it faces a number of tradeoffs. If it uses monetary policy to alter the exchange rate, it then cannot at the same time use monetary policy to address issues of inflation or recession. If it uses direct purchases and sales of foreign currencies in exchange rates, then it must face the issue of how it will handle its reserves of foreign currency. Finally, a pegged exchange rate can even create additional movements of the exchange rate; for example, even the possibility of government intervention in exchange rate markets will lead to rumors about whether and when the government will intervene, and dealers in the foreign exchange market will react to those rumors. Let's consider these issues in turn.

One concern with pegged exchange rate policies is that they imply a country's monetary policy is no longer focused on controlling inflation or shortening recessions, but now must also take the exchange rate into account. For example, when a country pegs its exchange rate, it will sometimes face economic situations where it would like to have an expansionary monetary policy to fight recession—but it cannot do so because that policy would depreciate its exchange rate and break its hard peg. With a soft peg exchange rate policy, the central bank can sometimes ignore the exchange rate and focus on domestic inflation or recession—but in other cases the central bank may ignore inflation or recession and instead focus on its soft peg exchange rate. With a hard peg policy, domestic monetary policy is effectively no longer determined by domestic inflation or unemployment, but only by what monetary policy is needed to keep the exchange rate at the hard peg.

Another issue arises when a central bank intervenes directly in the exchange rate market. If a central bank ends up in a situation where it is perpetually creating and selling its own currency on foreign exchange markets, it will be buying the currency of other countries, like U.S. dollars or euros, to hold as reserves. Holding large reserves of other currencies has an opportunity cost, and central banks will not wish to boost such reserves without limit.

In addition, a central bank that causes a large increase in the supply of money is also risking an inflationary surge in aggregate demand. Conversely, when a central bank wishes to buy its own currency, it can do so by using its reserves of international currency like the U.S. dollar or the euro. But if the central bank runs out of such reserves, it can no longer use this method to strengthen its currency. Thus, buying foreign currencies in exchange rate markets can be expensive and inflationary, while selling foreign currencies can work only until a central bank runs out of reserves.

Yet another issue is that when a government pegs its exchange rate, it may unintentionally create another reason for additional fluctuation. With a soft peg policy, foreign exchange dealers and international investors react to every rumor about how or when the central bank is likely to intervene to influence the exchange rate, and as they react to rumors the exchange rate will shift up and down. Thus, even though the goal of a soft peg policy is to reduce short-term fluctuations of the exchange rate, the existence of the policy—when anticipated in the foreign exchange market—may sometimes increase short-term fluctuations as international investors try to anticipate how and when the central bank will act. The following section discusses the effects of **international capital flows**—capital that flows across national boundaries as either portfolio investment or direct investment.

HOW DO TOBIN TAXES CONTROL THE FLOW OF CAPITAL?

Some countries like Chile and Malaysia have sought to reduce movements in exchange rates by limiting inflows and outflows of international financial capital. This policy can be enacted either through targeted taxes or by regulations.

Taxes on international capital flows are sometimes known as **Tobin taxes**, named after James Tobin, the 1981 Nobel laureate in economics who proposed such a tax in a 1972 lecture. For example, a government might tax all foreign exchange transactions, or attempt to tax short-term *portfolio investment* while exempting long-term foreign *direct investment*. Countries can also use regulation to forbid certain kinds of foreign investment in the first place or to make it difficult for international financial investors to withdraw their funds from a country.

The goal of such policies is to reduce international capital flows, especially short-term portfolio flows, in the hope that doing so will reduce the chance of large movements in exchange rates that can bring macroeconomic disaster.

But proposals to limit international financial flows have severe practical difficulties. Taxes are imposed by national governments, not international ones. If one government imposes a Tobin tax on exchange rate transactions carried out within its territory, the exchange rate market might easily be operated by a firm based someplace like the Grand Caymans, an island nation in the Caribbean well-known for allowing some financial wheeling and dealing. In an interconnected global economy, if goods and services are allowed to flow across national borders, then payments need to flow across borders, too. It is very difficult—in fact close to impossible—for a nation to allow only the flows of payments that relate to goods and services, while clamping down or taxing other flows of financial capital. If a nation participates in international trade, it must also participate in international capital movements.

Finally, countries all over the world, especially low-income countries, are crying out for foreign investment to help develop their economies. Policies that discourage international financial investment may prevent some possible harm, but they rule out potentially substantial economic benefits as well.

A hard peg exchange rate policy will not allow short-term fluctuations in the exchange rate. If the government first announces a hard peg and then later changes its mind—perhaps the government becomes unwilling to keep interest rates high or to hold high levels of foreign exchange reserves—then the result of abandoning a hard peg could be a dramatic shift in the exchange rate.

In the mid-2000s, about one-third of the countries in the world used a soft peg approach and about one-quarter used a hard peg approach. The general trend in the 1990s was to shift away from a soft peg approach in favor of either floating rates or a hard peg. The concern is that a successful soft peg policy may, for a time, lead to very little variation in exchange rates, so that firms and banks in the economy begin to act as if a hard peg exists. When the exchange rate does move, the effects are especially painful because firms and banks have not planned and hedged against a possible change. Thus, the argument went, it is better either to be clear that the exchange rate is always flexible, or that it is fixed, but choosing an in-between soft peg option may end up being worst of all.

Watch It

This video contrasts floating and fixed exchange rates and gives examples of ways the government could interfere in the market to affect exchange rates.

An interactive or media element has been excluded from this version of the text. You can view it online here: http://pb.libretexts.org/mlum/?p=677

A Merged Currency

A final approach to exchange rate policy is for a nation to choose a common currency shared with one or more nations is also called a merged currency. A merged currency approach eliminates foreign exchange risk altogether. Just as no one worries about exchange rate movements when buying and selling between New York and California, Europeans know that the value of the euro will be the same in Germany and France and other European nations that have adopted the euro.

However, a merged currency also poses problems. Like a hard peg, a merged currency means that a nation has given up altogether on domestic monetary policy, and instead has put its interest rate policies in other hands. When Ecuador uses the U.S. dollar as its currency, it has no voice in whether the Federal Reserve raises or lowers interest rates. The European Central Bank that determines monetary policy for the euro has representatives from all the euro nations. However, from the standpoint of, say, Portugal, there will be times when the decisions of the European Central Bank about monetary policy do not match the decisions that would have been made by a Portuguese central bank.

The lines between these four different exchange rate policies can blend into each other. For example, a soft peg exchange rate policy in which the government almost never acts to intervene in the exchange rate market will look a great deal like a floating exchange rate. Conversely, a soft peg policy in which the government intervenes often to keep the exchange rate near a specific level will look a lot like a hard peg. A decision to merge currencies with another country is, in effect, a decision to have a permanently fixed exchange rate with those countries, which is like a very hard exchange rate peg. The range of exchange rates policy choices, with their advantages and disadvantages, are summarized in Table 1.

Table 1. Tradeoffs of Exchange Rate Policies

Situation	Floating Exchange Rates	Soft Peg	Hard Peg	Merged Currency
Large short-run fluctuations in exchange rates?	Often a lot in the short term	Maybe less in the short run, but still large changes over time	None, unless a change in the fixed rate	None
Large long-term fluctuations in exchange rates?	Can often happen	Can often happen	Cannot happen unless hard peg changes, in which case substantial volatility can occur	Cannot happen
Power of central bank to conduct countercyclical monetary policy?	Flexible exchange rates make monetary policy stronger	Some power, although conflicts may arise between exchange rate policy and countercyclical policy	Very little; central bank must keep exchange rate fixed	None; nation does not have its own currency
Costs of holding foreign exchange reserves?	Do not need to hold reserves	Hold moderate reserves that rise and fall over time	Hold large reserves	No need to hold reserves
Risk of being stuck with an exchange rate that causes a large trade imbalance and very high inflows or outflows of financial capital?	Adjusts often	Adjusts over the medium term, if not the short term	May become stuck over time either far above or below the market level	Cannot adjust

Global macroeconomics would be easier if the whole world had one currency and one central bank. The exchange rates between different currencies complicate the picture. If exchange rates are set solely by financial markets, they fluctuate substantially as short-term portfolio investors try to

anticipate tomorrow's news. If the government attempts to intervene in exchange rate markets through soft pegs or hard pegs, it gives up at least some of the power to use monetary policy to focus on domestic inflations and recessions, and it risks causing even greater fluctuations in foreign exchange markets.

There is no consensus among economists about which exchange rate policies are best: floating, soft peg, hard peg, or merged currencies. The choice depends both on how well a nation's central bank can implement a specific exchange rate policy and on how well a nation's firms and banks can adapt to different exchange rate policies. A national economy that does a fairly good job at achieving the four main economic goals of growth, low inflation, low unemployment, and a sustainable balance of trade will probably do just fine most of the time with any exchange rate policy; conversely, no exchange rate policy is likely to save an economy that consistently fails at achieving these goals. On the other hand, a merged currency applied across wide geographic and cultural areas carries with it its own set of problems, such as the ability for countries to conduct their own independent monetary policies.

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Try It

These questions allow you to get as much practice as you need, as you can click the link at the top of the first question ("Try another version of these questions") to get a new set of questions. Practice until you feel comfortable doing the questions.

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Learning Objectives

[glossary-page][glossary-term]floating exchange rate:[/glossary-term]
[glossary-definition]a country lets the exchange rate market determine its currency's value[/glossary-definition][glossary-term]hard peg:[/glossary-term][glossary-definition]an exchange rate policy in which the central bank sets a fixed and unchanging value for the exchange rate[/glossary-definition][glossary-term]international capital flows:[/glossary-term]
[glossary-definition]flow of financial capital across national boundaries either as portfolio investment or direct investment[/glossary-definition][glossary-term]merged currency:[/glossary-term]
[glossary-definition]when a nation chooses to use another nation's currency[/glossary-definition][glossary-term]soft peg:[/glossary-term]
[glossary-definition]an exchange rate policy in which the government usually allows the market to set the exchange rate, but in some cases, especially if the exchange rate seems to be moving rapidly in one direction, the central bank will intervene[/glossary-definition][glossary-term]Tobin taxes:[/glossary-term]
[glossary-definition]see international capital flows[/glossary-definition][/glossary-page]

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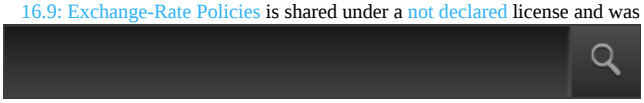
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16.10: Putting It Together- Exchange Rates and International Finance

The goal of this module was to explain how a nation's currency exchange rate affects its balance of trade and the state of the macroeconomy.



You learned about how:

- The foreign exchange market works
- Importers and exporters affect the demand and supply of foreign exchange
- Portfolio and direct investment affect the demand and supply of foreign exchange
- Changes in exchange rates cause changes in the trade balance
- How changes in the trade balance (surplus or deficit) affect the domestic economy
- How changes in exchange rates influence a nation's financial system
- To differentiate between different currency

You learned that since exchange rate changes can affect the both product markets and financial markets, nations need to carefully choose their exchange rate policies, since making the wrong choice can have unforeseen impacts on the economy. You also learned about appreciating and depreciating currencies, and that there are pros and cons to each. Do you think it's best for the United States to have a stronger currency?

IS A STRONGER Currency GOOD FOR ECONOMY?

The foreign exchange value of the dollar is a price and whether a higher price is good or bad depends on where you are standing: sellers benefit from higher prices and buyers are harmed. A stronger dollar is good for U.S. imports (and people working for U.S. importers) and U.S. investment abroad. It is also good for U.S. tourists going to other countries, since their dollar goes further. But a stronger dollar is bad for U.S. exports (and people working in U.S. export industries); it is bad for foreign investment in the United States (leading, for example, to higher U.S. interest rates); and it is bad for foreign tourists (as well as U.S hotels, restaurants, and others in the tourist industry). In short, whether the U.S. dollar is good or bad is a more complex question than you may have thought. The economic answer is "it depends." What we can say is that a stable U.S. dollar is good for the economy so that people can make their purchases and businesses can produce and sell without worrying about the value of the dollar in foreign exchange markets.

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16.11: Discussion- Global Currencies

Respond to the following prompts in a post with a minimum of 250 words, then comment on at least TWO other posts. Respond to the posts indicating your agreement or disagreement with their position and why. Feel free to bring in additional references to these reply posts.

You now understand the economies of the world use a free-floating exchange rate system. This system creates problems and benefits for anyone doing business outside their own borders. An interesting way to look at the difference in purchasing power of the USD (US Dollar) compared to other currencies is with the Big Mac Index. Be sure to read the footnotes at the bottom of the table. Notice the right-hand column gives the under/over valuation of that currency to the USD. Remember, this index is not an absolute measure, but it is a handy reference since Big Macs are available in every developed economy in the world. Use the index and a currency converter (like the one found here) to understand the exchange rate.

Discussion

- Find the currency of your home country and describe its value relative to the USD. If you are a U.S. citizen choose China, Japan, or the Eurozone (a country using the Euro). Is it under or over-valued compared to the USD? What problems or benefits do you think this relationship might cause for your country? Why?
- What problems or benefits do you think this relationship might cause for the US?
- Governments often intervene (manipulate) in foreign exchange markets to give their currency a more favorable rate. Do some research on the web to see what intervention has occurred or has been discussed lately regarding your country's currency.

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16.12: Assignment- Exchange Rates and International Finance

Microeconomic Question:

When a U.S. domestic producer begins selling exports, they typically need to worry about the foreign exchange market, since often the revenues an exporter earns are foreign currencies that then need to be traded into dollars. Because the foreign exchange value of the dollar tends to fluctuate, this adds an additional level of risk to the exporter's business. What are some factors that would make a domestic producer willing to take on this extra and new type of risk?

Rubric

Criteria	Not Evident	Developing	Proficient	Distinguished	Weight
What additional expertise would a producer need to trade successfully in the export market and the foreign exchange market? To what extent is this different from the expertise necessary to sell domestically?					6
How could a producer benefit from a larger market for its products?					6
What additional benefits might a producer obtain from exporting?					6
Write up your analysis using correct language, explaining all your work					2
					Total: 20

Macroeconomic Question:

Changes in the value of a nation's currency affect the nation's net exports, and thus GDP. How might this make a large country, like the U.S., more willing to adopt a flexible exchange rate regime than a small country, like Belgium?

Rubric

Criteria	Not Evident	Developing	Proficient	Distinguished	Weight
Why do large countries, like the U.S., typically have a lower portion of their GDP as exports and imports, than a small country like Belgium?					4
How does the size of a nation's trade sector affect the stability of its GDP?					3
How do exchange rate fluctuations affect a nation's GDP?					4
Why might a large country be more willing to adopt a flexible exchange rate than a small country would?					6
Write up your analysis using correct language, explaining all your work					3
					Total: 20

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16.13: Assignment- Problem Set — Exchange Rates and International Finance

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- Exchange Rates and International Finance Problem Set

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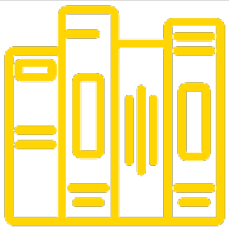
CHAPTER OVERVIEW

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17.1: Faculty Resource Overview



We've seen overwhelming demand for high quality, openly-licensed course materials, including supplemental resources to enrich teaching and learning and to make life easier for instructors. To support this need, we've developed and curated faculty resources to use with this course.

Free and Open Supplemental Materials

On the following pages, you will find supplemental resources that are freely available to use with the interactive learning materials for this course. Since these resources are openly licensed, you may use them as is or adapt them to your needs.

Additional Faculty Resources

Additional supplemental resources, learning tools, and support services are available to faculty who adopt Waymaker, OHM, or Candela courses with paid support from Lumen Learning. For many courses, these include some combination of summative assessments, answer keys, solutions manuals, or other materials shared only with authorized instructors in order to protect academic integrity.

Click here to learn more about additional instructor tools and resources available to faculty who adopt Lumen-supported courseware. Information about pricing and payment options is available on this page. Lumen's low-cost support fees replace the cost of expensive textbooks and may be paid by students or by the institution directly.

Continuously Improving Learning Materials

Are you interested in collaborating with us to make these course materials better? We use learning data to identify where content improvements are needed, and then we invite faculty and subject matter experts to work with us developing continuous improvements aimed at increasing learning.

Learn more from this blog post, or sign up here to join our continuous improvement mailing list and stay up to date about upcoming OER hackathons and other continuous improvement activities.

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17.2: Pacing



The Introduction to Macroeconomics textbook contains sixteen modules—roughly one module per week for a sixteen-week semester. Many choose not to teach every module, so sometimes fewer modules are covered during a semester. Although all the modules are similar in size and depth (aside from the first, introductory module which is more brief), some of the modules work well together and could easily be combined. Some modules may also be drawn out to cover more than one week. Some modules that work well together include:

- **Module 1: Economic Thinking** and **Module 2: Choice in a World of Scarcity**
- **Module 3: Supply and Demand** and **Module 4: Applications of Supply and Demand** OR
- **Module 4: Applications of Supply and Demand** and **Module 5: Elasticity**
- **Module 12: Money and Banking** and **Module 13: Monetary Policy**
- **Module 15: Globalization and Trade** and **Module 16: Exchange Rates and International Finance**

These modules are sometimes excluded, depending on faculty preferences or if the concepts are taught in microeconomics instead:

- **Module 5: Elasticity**
- **Module 10: The Income-Expenditure Model**
- **Module 15: Globalization and Trade**
- **Module 16: Exchange Rates and International Finance**

Course Modules:[1]

- Module 1: Economic Thinking*
- Module 2: Choice in a World of Scarcity*
- Module 3: Supply and Demand*
- Module 4: Applications of Supply and Demand*
- Module 5: Elasticity*
- Module 6: Macroeconomic Measures: GDP and Economic Growth
- Module 7: Macroeconomic Measures: Unemployment and Inflation
- Module 8: The Aggregate Demand-Aggregate Supply Model
- Module 9: Keynesian and Neoclassical Economics
- Module 10: The Income-Expenditure Model
- Module 11: Fiscal Policy
- Module 12: Money and Banking
- Module 13: Monetary Policy
- Module 14: Policy Application
- Module 15: Globalization and Trade*
- Module 16: Exchange Rates and International Finance*

1. *Starred modules are included in both the Lumen Microeconomics and Macroeconomics courses ↵

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17.3: PDF



Lumen makes significant investments to ensure our digital courseware is accessible, allowing students to learn using superior interactivity, multimedia, and a variety of accommodations for individuals with varying abilities.

PDFs offer an inferior learning experience compared to the richness and interactivity in our digital courseware. A PDF version of the textbook is available as a print alternative. The PDF does not include interactive content such as simulations, videos, and quizzes and is not vetted for accessibility. For these reasons, **we do not recommend using the textbook in the PDF form**. The offline version should be used as a print backup rather than as the primary textbook.

You can download the PDF using the following link:

Macroeconomics PDF

To share these files with your students, copy and paste the text and download link above into a page or announcement in your learning management system (Blackboard, Canvas, etc.).

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17.4: PowerPoints

A full set of PowerPoint decks is provided for download below. All decks are tightly aligned to the modules in this course. Since they are openly licensed, you are welcome to retain, reuse, revise, remix, and redistribute as desired.

These PowerPoint files are accessible. If you do revise them, make sure to follow these guidelines for creating accessible PowerPoints.

You can download all of the PowerPoints as a zip file here: Macroeconomics ppts zip.

They are available to download as individual decks below.

- Module 1: Economic Thinking
- Module 2: Choice in a World of Scarcity
- Module 3: Supply and Demand
- Module 4: Applications of Supply and Demand
- Module 5: Elasticity
- Module 6: Macroeconomic Measures: GDP and Economic Growth
- Module 7: Macroeconomic Measures: Unemployment and Inflation
- Module 8: The Aggregate Demand-Aggregate Supply Model
- Module 9: Keynesian and Neoclassical Economics
- Module 10: Keynesian Economics and the Income-Expenditure Model
- Module 11: Fiscal Policy
- Module 12: Money and Banking
- Module 13: Monetary Policy
- Module 14: Policy Applications
- Module 15: Globalization and Trade
- Module 16: Exchange Rates and International Finance

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17.5: Assignments

The assignments in this course are openly licensed, and are available as-is, or can be modified to suit your students' needs. Answer keys are available to faculty who adopt Waymaker, OHM, or Candela courses with paid support from Lumen Learning. This approach helps us protect the academic integrity of these materials by ensuring they are shared only with authorized and institution-affiliated faculty and staff.

The assignments and discussion for this course align with the content and learning outcomes in each module. They will automatically be loaded into the assignment tool within your LMS. They can easily used as is, modified, or removed. You can preview them below.

Note that the Data Project Assignment is split into two parts and spans both module 6 and module 7. The Module 16 assignment presents two options, one that emphasizes topics from macroeconomics, and the other that emphasizes concepts from

microeconomics.

Module	Assignment	Discussion
1 Economic Thinking		• Discussion: Is Economics a Science?
2 Choice in a World of Scarcity	• Assignment: Guns or Butter?	• Discussion: Making Irrational Choices
3 Supply and Demand	• Assignment: Supply and Demand of Coffee	• Discussion: Supply and Demand
4 Applications of Supply and Demand	• Assignment: Price Controls After a Storm	• Discussion: Price Controls
5 Elasticity	• Assignment: Elasticity and Tuition	• Discussion: Junk Food and Elasticity
6 Macroeconomic Measures: GDP and Economic Growth	• Assignment: Data Project Part 1	• Discussion: GDP and Economic Growth
7 Macroeconomic Measures: Unemployment and Inflation	• Assignment: The State of the Macro Economy (a good option if not utilizing the Data Project) • Assignment: Data Project Part 2	• Discussion: How is the Economy?
8 The Aggregate Demand-Aggregate Supply Model	• Assignment: Analysis of a Demand/Supply Shock using the AD-AS Model	• Discussion: The Business Cycle and the AD-AS
9 Keynesian and Neoclassical Economics	• Assignment: Keynesian and Neoclassical Economics	• Discussion: Keynesian vs. Neoclassical Economics
10 The Income-Expenditure Model	• Assignment: The Income-Expenditure Model	• Discussion: The Income-Expenditure Model
11 Fiscal Policy	• Assignment: Economic Impact of Lower	• Discussion: Fiscal Policy

	Corporate Tax Rate	
12 Money and Banking	• Assignment: Baby Boomers	• Discussion: Money and Banking
13 Monetary Policy	• Assignment: Chair the Fed	• Discussion: Impact of Low Interest Rates on Monetary Policy
14 Policy Applications	• Assignment: Policy Response to a Macro Shock	• Discussion: Macropolicy
15 Globalization and Trade	• Assignment: Absolute and Comparative Advantage	• Discussion: Absolute and Comparative Advantage
16 Exchange Rates and International Finance	• Assignment: Exchange Rates and International Finance *Consists of either a microeconomics or macroeconomics-emphasis	• Discussion: Global Currencies

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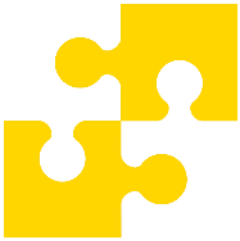
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17.6: Problem Sets



This course contains problem sets that accompany each module. In these problem sets, students are given an opportunity to apply the quantitative-reasoning skills they learned throughout the module.

The problem sets are derivatives from the practice questions that are scattered throughout the course for practice–sometimes housed within a content page or sometimes found on a separate page titled “Learn By Doing.” If students complete the practice questions, which allow unlimited attempts with various numbers, they may have already encountered the majority of the questions in the problem sets.

These will come automatically loaded into your assignment tool in your LMS, but may be downloaded, adjusted, deleted, or

personalized to fit your class needs.

Module	Problem Set
1 Economic Thinking	• Assignment: Problem Set — Economic Thinking
2 Choice in a World of Scarcity	• Assignment: Problem Set — Choice in a World of Scarcity
3 Supply and Demand	• Assignment: Problem Set — Supply and Demand
4 Applications of Supply and Demand	• Assignment: Problem Set — Applications of Supply and Demand
5 Elasticity	• Assignment: Problem Set — Elasticity
6 Macroeconomic Measures: GDP and Economic Growth	• Assignment: Problem Set — GDP and Economic Growth
7 Macroeconomic Measures: Unemployment and Inflation	• Assignment: Problem Set — Unemployment and Inflation
8 The Aggregate Demand-Aggregate Supply Model	• Assignment: Problem Set — The Aggregate Demand-Aggregate Supply Model
9 Keynesian and Neoclassical Economics	• Assignment: Problem Set — Keynesian and Neoclassical Economics
10 The Income-Expenditure Model	• Assignment: Problem Set — The Income-Expenditure Model
11 Fiscal Policy	• Assignment: Problem Set — Fiscal Policy
	• Assignment: Problem Set — Money and Banking

12 Money and Banking	
13 Monetary Policy	• Assignment: Problem Set — Monetary Policy
14 Policy Applications	• Assignment: Problem Set — Policy Applications
15 Globalization and Trade	• Assignment: Problem Set — Globalization and Trade
16 Exchange Rates and International Finance	• Assignment: Problem Set — Exchange Rates and International Finance

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17.7: Question Banks

The machine-graded assessments in this course are organized by module and are aligned to specific learning outcomes. Waymaker courses assess students in three locations: Show What You Know (ungraded pretests at the beginning of each module), Self-Checks (short, ungraded practice tests), and end-of-module quizzes (graded).

Authorized faculty may edit and delete quiz questions and also add new ones using the quiz editing tool inside their Waymaker course(s).

To learn more about editing the assessments in Waymaker, visit the "Using Waymaker" Knowledge Base AFTER the course package has been imported to your learning management system (Blackboard, Canvas, etc.).

Optional Download

The Show What You Know and Self-Check questions are also available as a separate file that can be downloaded and imported into the assessment tool in your LMS. This format and extra step are needed ONLY if you want to make your own customized quiz, midterm, or final exam that combines quiz questions from multiple modules.

There are 16 question banks with a total of 1004 multiple choice questions.

We provide quiz banks as QTI files, a standard format that allows you to import questions, build, and customize quizzes in most learning management systems (Canvas, Blackboard, etc.). **These files cannot be opened outside of an LMS.**

According to Lumen company policy, we do not provide quizzes in written (e.g. MS Word) form, in order to preserve the academic integrity of our quiz banks on behalf of everyone using our materials. We adopted this policy after observing how easy it is for quiz banks in written formats to find their way onto websites that promote academic cheating.

Click the name of your LMS to prompt the download of the file.

- Canvas
- Blackboard
- D2L
- Moodle

Once you've downloaded the file, visit the Quiz Imports page and click through to the directions for your LMS.

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17.8: I Need Help



Need more information about this course? Have questions about faculty resources? Can’t find what you’re looking for? Experiencing technical difficulties?

We’re here to help! Take advantage of the following Lumen customer-support resources:

- Check out one of Lumen’s Faculty User Guides here.
- Submit a support ticket here and tell us what you need.
- Talk and screen-share with a live human during Lumen’s OER office hours. See available times here.

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17.9: About This Course

Waymaker Macroeconomics (Summer 2018)

This macroeconomics course prepares students to think like economists and analyze decisions made by individuals, businesses, and governments. Students will learn about the key macroeconomic indicators of GDP, unemployment, and inflation, then apply these concepts to analyze economic behavior. Content coverage includes choice and scarcity; supply and demand; elasticity; applications of supply and demand; elasticity; gdp and economic growth; unemployment and inflation; the aggregate demand-aggregate supply model; Keynesian economics and neoclassical economics; the income-expenditure model; fiscal policy; money and banking; monetary policy; policy applications; globalization and trade; exchange rates and international finance.

Contributors

This course, based on OpenStax Principles of Economics, includes additional noteworthy contributions by the Lumen Learning team and:

- Steve Greenlaw (University of Mary Washington)
- Sophie Haci (Houston Community College)
- Melissa Walker (Nashville State Community College)
- Veronika Dolar (SUNY Old Westbury)
- Michael Fusillo (Tufts University)
- Shawn Kilpatrick (Northeastern University)
- Jennifer Pakula (Saddleback College)
- Clark Aldrich

What's New?

This new edition of Waymaker Macroeconomics includes significant improvements and enhancements:

Data-Driven Improvements

Several topics proved to be consistently difficult for the thousands of students who took a Waymaker Economics course during Fall 2017. We have made specific improvements to address these difficult topics, several of which are explained below:

- The Production Possibilities Frontier: The new version of the course includes additional applied graphing practice and two new videos on this topic (see https://courses.lumenlearning.com/wm-macroeconomics/chapter/the-production-possibilities-frontier/)
- Price Elasticity and Total Revenue: The new version of the course includes additional applied practice on this topic (see https://courses.lumenlearning.com/wm-macroeconomics/chapter/elasticity-and-total-revenue/)
- Surplus and Efficiency: The new version of the course includes a "Learn by Doing" page for additional practice in solving for consumer and producer surplus (see https://courses.lumenlearning.com/wm-macroeconomics/chapter/learn-by-doing-consumer-and-producer-surplus/)
- Graphs in Economics: The new version of the course includes several new practice questions, including those which enable students to manipulate graphs (see https://courses.lumenlearning.com/wm-macroeconomics/chapter/interpreting-slope/)

General Improvements

- **Improved course organization**
  - Modules are more consistent in size and depth
  - Content is organized around specific, granular, learning outcomes, which are listed at the top of each page
  - Practice questions, try it questions, and quiz questions all align with learning outcomes
- **"Try It" embedded practice questions** for every learning outcome (for example, on this page, Factors Affecting Demand, students learn about concepts and then immediately check their understanding with applied practice)
  - Some quantitative "Try It" questions are intentionally designed for unlimited practice using different number sets (example at the bottom of this page on Price Floors)
- **"Learn By Doing" pages** for even more practice

- Similar to the “Try It” questions, some “Learn By Doing” pages consist of quantitative practice questions that serve as another checkpoint for students to assess their own understanding (see Learn By Doing: Graphing Demand)
- Other “Learn By Doing” pages are simulations which allow students to manipulate variables and assess the impact of decisions (see Learn By Doing: Demand for Food Trucks)

- **“Watch It”** embedded videos that explain and reiterate key concepts throughout the course
  - Most videos come from Marginal Revolution University, Dr. Mary McGlasson (mjmfoodie), ACDC Economics, and Crash Course Economics
- **Interactive graphs** (as seen in the salmon fishing example on this page: Changes in Equilibrium)
  - Complicated graphs are explained in a step-by-step process to help students see and understand how the graph changes
- **Discussions and Assignments** for every module (available here with instructor log-in)
- **Problem Sets** for every module (available here with instruction log-in)

About Lumen

Lumen Learning’s mission is to enable unprecedented learning for all students.

We do this by using open educational resources (OER) to create well-designed and low-cost course materials that replace expensive textbooks. Because learning is about more than affordability and access, we also apply learning science insights and efficacy research to develop learning activities that are engineered to improve subject mastery, course completion and retention.

If you’d like to connect with us to learn more about adopting this course, please Contact Us.

You can also make an appointment for OER Office Hours to connect virtually with a live Lumen expert about any question you may have.

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17.10: Course Contents at a Glance

The following list is a summary of the topics covered in this macroeconomics course.

Module 1: Economic Thinking

- Understanding Economics and Scarcity
- The Concept of Opportunity Cost
- Labor, Markets, and Trade
- Microeconomics and Macroeconomics
- Economic Models
- Purpose of Functions
- Solving Simple Equations
- Creating and Interpreting Graphs
- Interpreting Slope
- Types of Graphs

Module 2: Choice in a World of Scarcity

- Budget Constraints and Choices
- Calculating Opportunity Cost
- The Production Possibilities Frontier
- Productive Efficiency and Allocative Efficiency
- Rationality and Self-Interest
- Marginal Analysis
- Positive and Normative Statements

Module 3: Supply and Demand

- Economic Systems
- What Is Demand?
- Factors Affecting Demand
- What is Supply?
- Factors Affecting Supply
- Equilibrium, Surplus, and Shortage
- Changes in Equilibrium
- Finding Equilibrium
- Changes in Supply and Demand

Module 4: Applications of Supply and Demand

- Price Ceilings
- Price Floors
- A Closer Look at Price Controls
- Trade and Efficiency
- Consumer & Producer Surplus
- Inefficiency of Price Floors and Price Ceilings
- Labor and Financial Markets

Module 5: Elasticity

- Elasticity of Demand
- Examples of Elastic and Inelastic Demand
- Calculating Elasticity and Percentage Changes
- Calculating Price Elasticities Using the Midpoint Formula
- Categories of Elasticity
- Price Elasticity of Supply
- Income Elasticity, Cross-Price Elasticity & Other Types of Elasticities
- Elasticity and Total Revenue
- Elasticity, Costs, and Customers
- Tax Incidence

Module 6: Macroeconomic Measures: GDP and Economic Growth

- The Macroeconomic Perspective
- What is Gross Domestic Product?
- Calculating GDP
- Alternative Ways to Measure the Economy
- The Difference Between Nominal and Real Measurements
- Comparing Nominal and Real GDP
- Converting Nominal to Real GDP
- Business Cycles
- GDP and Standard of Living
- Labor Productivity and Economic Growth
- Measuring Productivity and Growth Rates
- The Power of Sustained Economic Growth
- Relatively Recent Economic Growth
- A Healthy Climate for Economic Growth

Module 7: Macroeconomic Measures: Unemployment and Inflation

- Who Counts in Unemployment?
- Calculating the Unemployment Rate
- Patterns of Unemployment
- Cyclical Unemployment
- Frictional and Structural Unemployment
- The Natural Rate of Unemployment
- Inflation
- Calculating Inflation with Index Numbers
- The Consumer Price Index
- Shortcomings of the Consumer Price Index as a Measure of the Cost of Living
- The GDP Deflator and Other Major Price Indices
- Problems with Inflation
- Benefits of Low Inflation

Module 8: The Aggregate Demand-Aggregate Supply Model

- The Aggregate Demand-Aggregate Supply Model
- Building a Model of Aggregate Supply and Aggregate Demand
- Interpreting the AD-AS Model
- Shifts in Aggregate Demand
- Shifts in Aggregate Supply
- Business Cycles and Growth in the AD–AS Model

Module 9: Keynesian and Neoclassical Economics

- Aggregate Demand in Keynesian Analysis
- The Core of Keynesian Analysis
- The Expenditure Multiplier Effect
- Keynesian Economic Policy
- The Neoclassical Perspective
- The Neoclassical Perspective and Potential GDP
- Flexible Prices and Graphing in the Neoclassical Model
- Speed of Macroeconomic Adjustment
- Policy Implications of the Neoclassical Perspective
- Say's Law versus Keynes' Law
- Neoclassical and Keynesian Perspectives in the AD-AS Model
- Balancing Keynesian and Neoclassical Models

Module 10: Keynesian Economics and the Income-Expenditure Model

- The Key Role of Aggregate Expenditure
- Aggregate Expenditure: Consumption
- Aggregate Expenditure: Investment, Government Spending, and Net Exports
- Equilibrium in the Income-Expenditure Model
- Finding Equilibrium Using Algebra
- Recessionary and Inflationary Gaps in the Income-Expenditure Model
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17.11: Learning Outcomes



The content, assignments, and assessments for this course are aligned to the following learning outcomes. A full list of course learning outcomes can be viewed here: Macroeconomics Course Learning Outcomes.

Module 1: Economic Thinking

- Explain what economics is and explain why it is important
- Use mathematics in common economic applications
- Use graphs in common economic applications

Module 2: Choice in a World of Scarcity

- Explain the cost of choices and trade-offs
- Illustrate society's trade-offs by using a production possibilities frontier, or curve
- Explain the assumption of rationality by individuals and firms

Module 3: Supply and Demand

- Describe and differentiate between major economic systems
- Explain the determinants of demand
- Explain the determinants of supply
- Explain and graphically illustrate market equilibrium, surplus and shortage

Module 4: Applications of Supply and Demand

- Analyze the economic effect of government setting price ceilings and floors
- Define, calculate, and illustrate consumer, producer, and total surplus
- Examine ways that supply and demand apply to labor and financial markets

Module 5: Elasticity

- Explain the concept of elasticity
- Explain the price elasticity of demand and price elasticity of supply, and compute both using the midpoint method
- Explain and calculate other elasticities using common economic variables
- Explain the relationship between a firm's price elasticity of demand and total revenue

Module 6: Macroeconomic Measures: GDP and Economic Growth

- Define macroeconomics and explain how economic indicators like GDP are used to assess the state of the economy
- Differentiate between and calculate nominal and real GDP
- Describe economic growth
- Understand that economic growth is a relatively recent phenomenon, and identify key institutional factors that contribute to economic growth

Module 7: Macroeconomic Measures: Unemployment and Inflation

- Describe and calculate unemployment
- Examine causes and types of unemployment, including cyclical, frictional, structural, and natural unemployment
- Define inflation and explain how the rate of inflation is calculated

- Identify the consequences of inflation

Module 8: The Aggregate Demand-Aggregate Supply Model

- Use the AD-AS model to explain the equilibrium levels of real GDP and price level
- Examine factors that shift aggregate supply and aggregate demand
- Illustrate economic growth, unemployment, and inflation using the AS/AD model

Module 9: Keynesian and Neoclassical Economics

- Describe the tenets of Keynesian Economics
- Explain policy implications of Keynesian economics
- Understand the tenets of Neoclassical Economics
- Describe how the neoclassical model responds to fluctuations in the economy and explain policy recommendations
- Compare and contrast the Keynesian and Neoclassical perspectives

Module 10: The Income-Expenditure Model

- Use the expenditure output model to explain periods of recession and expansion
- Explain and find macro equilibrium in the income-expenditure model
- Explain why the expenditure multiplier happens and how to calculate its size

Module 11: Fiscal Policy

- Identify the major spending categories and major revenue sources in the U.S. Federal budget
- Explain fiscal policies, including automatic, expansionary, and contractionary fiscal policies
- Compare neoclassical and Keynesian approaches to Fiscal Policy

Module 12: Money and Banking

- Define money, explain the functions of money, and define liquidity
- Describe the role financial markets play in an economy
- Explain what a bank does
- Describe how money is created by lending

Module 13: Monetary Policy

- Explain the structure, functions, and responsibilities of the Federal Reserve System
- Describe monetary policy and the Fed’s three main policy tools
- Explain how monetary policy affects GDP and the interest rates

Module 14: Policy Applications

- Compare viewpoints on government spending and taxes between the Keynesian and Neoclassical perspectives
- Explain the reasoning behind the theory of the Phillips Curve and why it may not hold
- Describe the basic tenets of new classical economics, including Ricardian equivalence
- Identify appropriate macro policy options in response to the state of the economy

Module 15: Globalization and Trade

- Define and calculate comparative advantage, and understand how countries choose which goods and services to trade internationally
- Explain how barriers to trade (like tariffs, quotas and non-tariff barriers) affect businesses, consumers and workers in the economy
- Differentiate between alternative international trade regimes and how they impact global trade

Module 16: Exchange Rates and International Finance

- Define currency exchange rates and explain how they influence trade balances
- Analyze how supply and demand affects foreign currencies and exchange rates

- Explain how the balance of trade (surplus or deficit) affects the domestic economy

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