ECON21003 PRINCIPLES OF MACROECONOMICS



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Principles of Macroeconomics

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Detailed Licensing

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CHAPTER OVERVIEW

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1.1: Introduction



Figure 1.1 Do You Use Facebook? Economics is greatly impacted by how well information travels through society. Today, social media giants Twitter, Facebook, and Instagram are major forces on the information super highway. (Credit: modification of "Social Media Mixed Icons - Banner" by Blogtrepreneur/Flickr, CC BY 2.0)

Chapter Objectives

In this chapter, you will learn about:

- What Is Economics, and Why Is It Important?
- Microeconomics and Macroeconomics
- How Economists Use Theories and Models to Understand Economic Issues
- How Economies Can Be Organized: An Overview of Economic Systems

Bring It Home

Information Overload in the Information Age

To post or not to post? Every day we are faced with a myriad of decisions, from what to have for breakfast, to which show to stream, to the more complex—"Should I double major and add possibly another semester of study to my education?" Our response to these choices depends on the information we have available at any given moment. Economists call this "imperfect" because we rarely have all the data we need to make perfect decisions. Despite the lack of perfect information, we still make hundreds of decisions a day.

Streams, sponsors, and social media are altering the process by which we make choices, how we spend our time, which movies we see, which products we buy, and more. Whether they read the reviews or just check the ratings, it's unlikely for Americans to make many significant decisions without these information streams.

As you will see in this course, what happens in economics is affected by how well and how fast information disseminates through a society, such as how quickly information travels through Facebook. "Economists love nothing better than when deep and liquid markets operate under conditions of perfect information," says Jessica Irvine, National Economics Editor for News Corp Australia.

This leads us to the topic of this chapter, an introduction to the world of making decisions, processing information, and understanding behavior in markets —the world of economics. Each chapter in this book will start with a discussion about current (or sometimes past) events and revisit it at chapter's end—to "bring home" the concepts in play.

What is economics and why should you spend your time learning it? After all, there are other disciplines you could be studying, and other ways you could be spending your time. As the Bring it Home feature just mentioned, making choices is at the heart of

what economists study, and your decision to take this course is as much as economic decision as anything else.

Economics is probably not what you think. It is not primarily about money or finance. It is not primarily about business. It is not mathematics. What is it then? It is both a subject area and a way of viewing the world.

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1.2: What Economics Is and Why is it Important

Learning Objectives

By the end of this section, you will be able to:

- Discuss the importance of studying economics
- Explain the relationship between production and division of labor
- Evaluate the significance of scarcity

Economics is the study of how humans make decisions in the face of scarcity. These can be individual decisions, family decisions, business decisions or societal decisions. If you look around carefully, you will see that scarcity is a fact of life. Scarcity means that human wants for goods, services and resources exceed what is available. Resources, such as labor, tools, land, and raw materials are necessary to produce the goods and services we want but they exist in limited supply. Of course, the ultimate scarce resource is time- everyone, rich or poor, has just 24 expendable hours in the day to earn income to acquire goods and services, for leisure time, or for sleep. At any point in time, there is only a finite amount of resources available.

Think about it this way: In 2015 the labor force in the United States contained over 158 million workers, according to the U.S. Bureau of Labor Statistics. The total land area was 3,794,101 square miles. While these are certainly large numbers, they are not infinite. Because these resources are limited, so are the numbers of goods and services we 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.

Introduction to FRED

Data is very important in economics because it describes and measures the issues and problems that economics seek to understand. A variety of government agencies publish economic and social data. For this course, we will generally use data from the St. Louis Federal Reserve Bank's FRED database. FRED is very user friendly. It allows you to display data in tables or charts, and you can easily download it into spreadsheet form if you want to use the data for other purposes. The FRED website includes data on nearly 400,000 domestic and international variables over time, in the following broad categories:

- Money, Banking & Finance
- Population, Employment, & Labor Markets (including Income Distribution)
- National Accounts (Gross Domestic Product & its components), Flow of Funds, and International Accounts
- Production & Business Activity (including Business Cycles)
- Prices & Inflation (including the Consumer Price Index, the Producer Price Index, and the Employment Cost Index)
- International Data from other nations
- U.S. Regional Data
- Academic Data (including Penn World Tables & NBER Macrohistory database)

For more information about how to use FRED, see the variety of videos on YouTube starting with this introduction.



Figure 1.2 Scarcity of Resources People experiencing homelessness are a stark reminder that scarcity of resources is real. (Credit: "Pittsburgh Homeless" by "daveyinn"/Flickr Creative Commons, CC BY 2.0)

If you still do not believe that scarcity is a problem, consider the following: Does everyone require food to eat? Does everyone need a decent place to live? Does everyone have access to healthcare? In every country in the world, there are people who are hungry, homeless (for example, those who call park benches their beds, as Figure 1.2 shows), and in need of healthcare, just to focus on a few critical goods and services. Why is this the case? It is because of scarcity. Let's delve into the concept of scarcity a little deeper, because it is crucial to understanding economics.

The Problem of Scarcity

Think about all the things you consume: food, shelter, clothing, transportation, healthcare, and entertainment. How do you acquire those items? You do not produce them yourself. You buy them. How do you afford the things you buy? You work for pay. If you do not, someone else does on your behalf. Yet most of us never have enough income to buy all the things we want. This is because of scarcity. So how do we solve it?

Link It Up

Visit this website to read about how the United States is dealing with scarcity in resources.

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. How do we use our limited resources the best way possible, that is, to obtain the most goods and services we can? There are a couple of options. First, we could each produce everything we each consume. Alternatively, we could each produce some of what we want to consume, and "trade" for the rest of what we want. Let's explore these options. Why do we not each just produce all of the things we consume? Think back to pioneer days, when individuals knew how to do so much more than we do today, from building their homes, to growing their crops, to hunting for food, to repairing their equipment. Most of us do not know how to do all—or any—of those things, but it is not because we could not learn. Rather, we do not have to. The reason why is something called *the division and specialization of labor*, a production innovation first put forth by Adam Smith (Figure 1.3) in his book, *The Wealth of Nations*.



Figure 1.3 Adam Smith Adam Smith introduced the idea of dividing labor into discrete tasks. (Credit: "Adam Smith" by Cadell and Davies (1811), John Horsburgh (1828), or R.C. Bell (1872)/Wikimedia Commons, Public Domain)

The Division of and Specialization of Labor

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 on economics in the centuries before Smith, but he was the first to address the subject in a comprehensive way. In the first chapter, Smith introduces the concept of division of labor, which means that the way one produces a good or service is divided into a number of tasks that different workers perform, instead of all the tasks being done by the same person.

To illustrate division of labor, Smith counted how many tasks went into 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, and packaging pins for sale, to name just a few. Smith counted 18 distinct tasks that different people performed—all for a pin, believe it or not!

Modern businesses divide tasks as well. Even a relatively simple business like a restaurant divides the task of serving meals into a range of jobs like top chef, sous chefs, less-skilled kitchen help, servers to wait on the tables, a greeter at the door, janitors to clean up, and a business manager to handle paychecks and bills—not to mention the economic connections a restaurant has with suppliers of food, furniture, kitchen equipment, and the building where it is located. A complex business like a large manufacturing factory, such as the shoe factory (Figure 1.4), or a hospital can have hundreds of job classifications.



Figure 1.4 Division of Labor Workers on an assembly line are an example of the divisions of labor. (Credit: "Red Wing Shoe Factory Tour" by Nina Hale/Flickr Creative Commons, CC BY 2.0)

Why the Division of Labor Increases Production

When we divide and subdivide the tasks involved with producing a good or service, workers and businesses can produce a greater quantity of output. In his observations of pin factories, Smith noticed that one worker alone might make 20 pins in a day, but that a small business of 10 workers (some of whom would need to complete two or three of the 18 tasks involved with pin-making), could make 48,000 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 where they have an advantage. (In later chapters, we will develop this idea by discussing comparative 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 in turn shaped by interests and talents. Only those with medical degrees qualify to become doctors, for instance. For some goods, geography affects specialization. For example, it is 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 is 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 effective 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 (sometimes called its “core competency”) 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 100 cars per year, each car will be quite expensive to make on average. However, if a factory produces 50,000 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 be lower. 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.

Trade and Markets

Specialization only makes sense, though, if workers can use the pay they receive for doing their jobs to purchase the other goods and services that 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 do not have to know anything about artificial fibers or the construction of sewing machines if you need a jacket—you just buy the jacket and wear it. You do not need to know anything about internal combustion engines to operate a car—you just get in and drive. 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.

Why Study Economics?

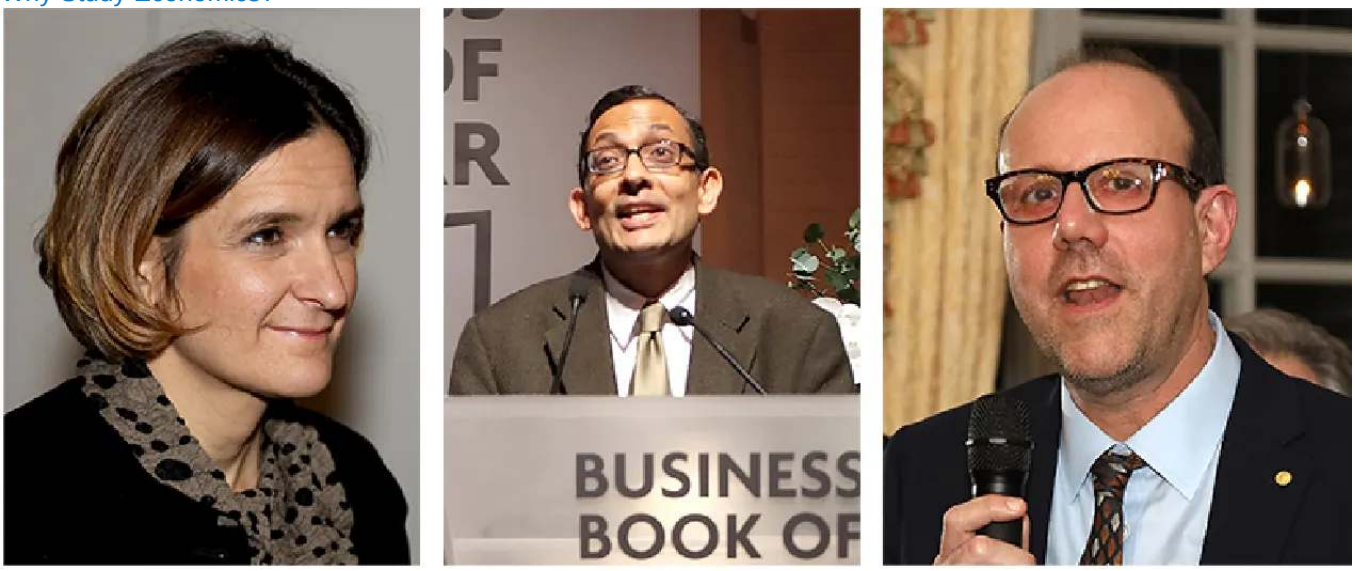


Figure 1.5 Esther Duflo, Abhijit Banerjee, and Michael Kremer Esther Duflo, Abhijit Banerjee (both from Massachusetts Institute of Technology), and Michael Kremer (University of Chicago) were awarded the Nobel Prize for groundbreaking work in which they established experimental methods to understand poverty and outcomes of initiatives to address it. (Credit: modification of work by U.S. Embassy Sweden/Wikimedia Commons, CC BY 2.0; Financial Times/Wikimedia Commons, CC BY 2.0; U.S. Embassy Sweden/Flickr Creative Commons, CC BY 2.0)

Now that you have an overview on what economics studies, let's quickly discuss why you are right to study it. Economics is not primarily a collection of facts to memorize, although there are plenty of important concepts to learn. Instead, think of economics as a collection of questions to answer or puzzles to work. Most importantly, economics provides the tools to solve those puzzles.

Consider the complex and critical issue of education barriers on national and regional levels, which affect millions of people and result in widespread poverty and inequality. Governments, aid organizations, and wealthy individuals spend billions of dollars each year trying to address these issues. Nations announce the revitalization of their education programs; tech companies donate devices and infrastructure, and celebrities and charities build schools and sponsor students. Yet the problems remain, sometimes almost as pronounced as they were before the intervention. Why is that the case? In 2019, three economists—Esther Duflo, Abhijit Banerjee, and Michael Kremer—were awarded the Nobel Prize for their work to answer those questions. They worked diligently to break the widespread problems into smaller pieces, and experimented with small interventions to test success. The award citation credited their work with giving the world better tools and information to address poverty and improve education. Esther Duflo, who is the youngest person and second woman to win the Nobel Prize in Economics, said, "We believed that like the war on cancer, the war on poverty was not going to be won in one major battle, but in a series of small triumphs. . . . This work and the culture of learning that it fostered in governments has led to real improvement in the lives of hundreds of millions of poor people."

As you can see, economics affects far more than business. For example:

- Virtually every major problem facing the world today, from global warming, to world poverty, to the conflicts in Syria, Afghanistan, and Somalia, has an economic dimension. If you are going to be part of solving those problems, you need to be able to understand them. Economics is crucial.
- It is hard to overstate the importance of economics to good citizenship. You need to be able to vote intelligently on budgets, regulations, and laws in general. When the U.S. government came close to a standstill at the end of 2012 due to the "fiscal cliff," what were the issues? Did you know?

- A basic understanding of economics makes you a well-rounded thinker. When you read articles about economic issues, you will understand and be able to evaluate the writer's argument. When you hear classmates, co-workers, or political candidates talking about economics, you will be able to distinguish between common sense and nonsense. You will find new ways of thinking about current events and about personal and business decisions, as well as current events and politics.

The study of economics does not dictate the answers, but it can illuminate the different choices.

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1.3: Microeconomics and Macroeconomics

Learning Objectives

By the end of this section, you will be able to:

- Describe microeconomics
- Describe macroeconomics
- Contrast monetary policy and fiscal policy

Economics is concerned with the well-being of *all* people, including those with jobs and those without jobs, as well as those with high incomes and those with low incomes. Economics acknowledges that production of useful goods and services can create problems of environmental pollution. It explores the question of how investing in education helps to develop workers' skills. It probes questions like how to tell when big businesses or big labor unions are operating in a way that benefits society as a whole and when they are operating in a way that benefits their owners or members at the expense of others. It looks at how government spending, taxes, and regulations affect decisions about production and consumption.

It should be clear by now that economics covers considerable ground. We can divide that ground 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 of production, the number of unemployed people, the inflationary increase in prices, government deficits, and levels of exports and imports. Microeconomics and macroeconomics are not separate subjects, but 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 lake's ecosystem from top to bottom; what eats what, how the system stays in a rough balance, and what environmental stresses affect this balance. Both approaches are useful, and both examine 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 viewpoint.

Whether you are scrutinizing lakes or economics, the micro and the macro insights should blend with each other. In studying a lake, the micro insights about particular plants and animals help 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 whether the macroeconomy is healthy. For example, firms will be more likely to hire workers if the overall economy is growing. In turn, macroeconomy's performance ultimately depends on the microeconomic decisions that individual households and businesses make.

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 the 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 microeconomics part of this book, we will learn about the theory of consumer behavior, the theory of the firm, how markets for labor and other resources work, and how markets sometimes fail to work properly.

Macroeconomics

What determines the level of economic activity in a society? In other words, what determines how many goods and services a nation actually produces? 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 to lay them off? Finally, what causes the economy to grow over the long term?

We can determine an economy's macroeconomic health by examining a number of goals: growth in the standard of living, low unemployment, and low inflation, to name the most important. How can we use government macroeconomic policy to pursue these goals? A nation's central bank conducts monetary policy, which involves policies that affect bank lending, interest rates, and financial capital markets. For the United States, this is the Federal Reserve. A nation's legislative body determines fiscal policy, which involves government spending and taxes. For the United States, this is the Congress and the executive branch, which originates the federal budget. These are the government's main tools. 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 we will explore in the macroeconomic chapters of this book.

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1.4: How Economists Use Theories and Models to Understand Economic Issues

Learning Objectives

By the end of this section, you will be able to:

- Interpret a circular flow diagram
- Explain the importance of economic theories and models
- Describe goods and services markets and labor markets



Figure 1.6 John Maynard Keynes One of the most influential economists in modern times was John Maynard Keynes. (Credit: "John Maynard Keynes" by IMF/Wikimedia Commons, Public Domain)

John Maynard Keynes (1883–1946), one of the greatest economists of the twentieth century, pointed out that economics is not just a subject area but also a way of thinking. Keynes (Figure 1.6) famously wrote in the introduction to a fellow economist's book: "[Economics] is a method rather than a doctrine, an apparatus of the mind, a technique of thinking, which helps its possessor to draw correct conclusions." In other words, economics teaches you how to think, not what to think.

Link It Up

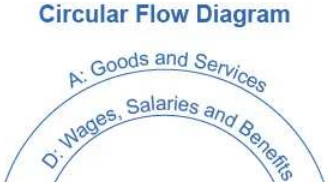
Watch this video about John Maynard Keynes and his influence on economics.

Economists see the world through a different lens than anthropologists, biologists, classicists, or practitioners of any other discipline. They analyze issues and problems using economic theories that are based on particular assumptions about human behavior. These assumptions tend to be different than the assumptions an anthropologist or psychologist might use. A theory is a simplified representation of how two or more variables interact with each other. The purpose of a theory is to take a complex, real-world issue and simplify it down to its essentials. If done well, this enables the analyst to understand the issue and any problems around it. A good theory is simple enough to understand, while complex enough to capture the key features of the object or situation you are studying.

Sometimes economists use the term model instead of theory. Strictly speaking, a theory is a more abstract representation, while a model is a more applied or empirical representation. We use models to test theories, but for this course we will use the terms interchangeably.

For example, an architect who is planning a major office building will often 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, which are more rough and unfinished than the final product, but can still demonstrate how the new product will work.

A good model to start with in economics is the circular flow diagram (Figure 1.7). It pictures the economy as consisting of two groups—households and firms—that interact in two markets: the goods and services market in which firms sell and households buy and the labor market in which households sell labor to business firms or other employees.



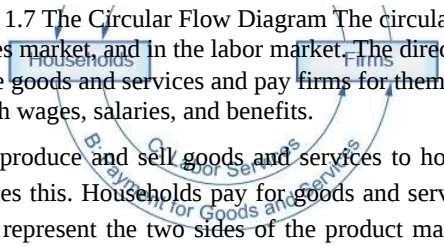


Figure 1.7 The Circular Flow Diagram The circular flow diagram shows how households and firms interact in the goods and services market, and in the labor market. The direction of the arrows shows that in the goods and services market, households receive goods and services and pay firms for them. In the labor market, households provide labor and receive payment from firms through wages, salaries, and benefits.

Firms produce and sell goods and services to households in the market for goods and services (or product market). Arrow “A” indicates this. Households pay for goods and services, which becomes the revenues to firms. Arrow “B” indicates this. Arrows A and B represent the two sides of the product market. Where do households obtain the income to buy goods and services? They provide the labor and other resources (e.g., land, capital, raw materials) firms need to produce goods and services in the market for inputs (or factors of production). Arrow “C” indicates this. In return, firms pay for the inputs (or resources) they use in the form of wages and other factor payments. Arrow “D” indicates this. Arrows “C” and “D” represent the two sides of the factor market.

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 this to make the picture easier to grasp. In the diagram, firms produce goods and services, which they sell to households in return for revenues. The outer circle shows this, and represents the two sides of the product market (for example, the market for goods and services) in which households demand and firms supply. Households sell their labor as workers to firms in return for wages, salaries, and benefits. The inner circle shows this and 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, and interactions with the rest of the globe (imports and exports).

Economists carry a set of theories in their heads like a carpenter carries around a toolkit. When they see an economic issue or problem, they go through the theories they know to see if they can find one that fits. Then they use the theory to derive insights about the issue or problem. Economists express theories as diagrams, graphs, or even as mathematical equations. (Do not worry. In this course, we will mostly use graphs.) Economists do not figure out the answer to the problem first and then draw the graph to illustrate. Rather, they use the graph of the theory to help them figure out the answer. Although at the introductory level, you can sometimes figure out the right answer without applying a model, if you keep studying economics, before too long you will run into issues and problems that you will need to graph to solve. We explain both micro and macroeconomics in terms of theories and models. The most well-known theories are probably those of supply and demand, but you will learn a number of others.

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1.5: How Economies Can Be Organized- An Overview of Economic Systems

Learning Objectives

By the end of this section, you will be able to:

- Contrast traditional economies, command economies, and market economies
- Explain gross domestic product (GDP)
- Assess the importance and effects of globalization

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 ensures that, for example, the number of televisions a society provides is the same as the amount it needs and wants? Who ensures that the right number of employees work in the electronics industry? Who ensures that televisions are produced in the best way possible? How does it all get done?

There are at least three ways that societies organize an economy. The first is the traditional economy, which is the oldest economic system and is used in parts of Asia, Africa, and South America. Traditional economies organize their economic affairs the way they have always done (i.e., tradition). Occupations stay in the family. Most families are farmers who grow the crops using traditional methods. What you produce is what you consume. Because tradition drives the way of life, there is little economic progress or development.



Figure 1.8 A Command Economy Ancient Egypt was an example of a command economy. (Credit: "Pyramids at Giza" by Jay Bergesen/Flickr Creative Commons, CC BY 2.0)

Command economies are very different. 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 those in Figure 1.8, 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, communism emphasized command economies.

In a command economy, the government decides what goods and services will be produced and what prices it will charge for them. The government decides what methods of production to use and sets wages for workers. The government provides many necessities like healthcare and education for free. Currently, Cuba and North Korea have command economies.



Figure 1.9 A Market Economy Nothing says "market" more than The New York Stock Exchange. (Credit: work by Erik Drost/Flickr Creative Commons, CC BY 2.0)

Although command economies have a very centralized structure for economic decisions, market economies have a very decentralized structure. A market is an institution that brings together buyers and sellers of goods or services, who may be either individuals or businesses. The New York Stock Exchange (Figure 1.9) is a prime example of a market which brings buyers and sellers together. In a market economy, decision-making is decentralized. Market economies are based on private enterprise: the private individuals or groups of private individuals own and operate the means of production (resources and businesses). Businesses supply goods and services based on demand. (In a command economy, by contrast, the government owns resources and businesses.) Supply of goods and services depends on what the demands are. A person's income is based on their ability to convert resources (especially labor) into something that society values. The more society values the person's output, the higher the income (think Lady Gaga or LeBron James). In this scenario, market forces, not governments, determine economic decisions.

Most economies in the real world are mixed. They combine elements of command and market (and even traditional) 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 the U.S. economy. China and Russia, while over the past several decades have moved more in the direction of having a market-oriented system, remain closer to the command economy end of the spectrum. The Heritage Foundation provides perspective on countries' economic freedom, as the following Clear It Up feature discusses.

Clear It Up

What countries are considered economically free?

Who is in control of economic decisions? Are people free to do what they want and to work where they want? Are businesses free to produce when they want and what they choose, and to hire and fire as they wish? Are banks free to choose who will receive loans, or does the government control these kinds of choices? Each year, researchers at the Heritage Foundation and the *Wall Street Journal* look at 50 different categories of economic freedom for countries around the world. They give each nation a score based on the extent of economic freedom in each category. Note that while the Heritage Foundation/WSJ index is widely cited by an array of scholars and publications, it should be regarded as only one viewpoint. Some experts indicate that the index's category choices and scores are politically biased. However, the index and others like it provide a useful resource for critical discussion of economic freedom.

The 2016 Heritage Foundation's Index of Economic Freedom report ranked 178 countries around the world: Table 1.1 lists some examples of the most free and the least free countries. Although technically not a separate country, Hong Kong has been granted a degree of autonomy such that, for purposes of measuring economic statistics, it is often treated as a separate country. Several additional countries were not ranked because of extreme instability that made judgments about economic freedom impossible. These countries include Afghanistan, Iraq, Libya, Syria, Somalia, and Yemen.

The assigned rankings are inevitably based on estimates, yet even these rough measures can be useful for discerning trends. In 2015, 101 of the 178 included countries shifted toward greater economic freedom, although 77 of the countries shifted toward less economic freedom. In recent decades, the overall trend has been a *higher level of economic freedom around the world*.

Most Economic Freedom	Least Economic Freedom
1. Hong Kong	167. Timor-Leste
2. Singapore	168. Democratic Republic of Congo
3. New Zealand	169. Argentina
4. Switzerland	170. Equatorial Guinea
5. Australia	171. Iran
6. Canada	172. Republic of Congo
7. Chile	173. Eritrea
8. Ireland	174. Turkmenistan
9. Estonia	175. Zimbabwe
10. United Kingdom	176. Venezuela
11. United States	177. Cuba
12. Denmark	178. North Korea

Table 1.1 Economic Freedoms, 2016 (Source: The Heritage Foundation, 2016 Index of Economic Freedom, Country Rankings, http://www.heritage.org/index/ranking)

Regulations: The Rules of the Game

Markets and government regulations are always entangled. There is no such thing as an absolutely free market. Regulations always define the "rules of the game" in the economy. Economies that are primarily market-oriented have fewer regulations—ideally just enough to maintain an even playing field for participants. At a minimum, these laws govern matters like safeguarding private property against theft, protecting people from violence, enforcing legal contracts, preventing fraud, and collecting taxes. Conversely, even the most command-oriented economies operate using markets. How else would buying and selling occur? The government heavily regulates decisions of what to produce and prices to charge. Heavily regulated economies often have underground economies (or black markets), which are markets where the buyers and sellers make transactions without the government's approval.

The question of how to organize economic institutions is typically not a straightforward choice between all market or all government, but instead involves a balancing act over the appropriate combination of market freedom and government rules.



Figure 1.10 Globalization Cargo ships are one mode of transportation for shipping goods in the global economy. (Credit: "Cargo Ship" by Raul Valdez/Flickr Creative Commons, CC BY 2.0)

The Rise of Globalization

Recent decades have seen a trend toward globalization, which is the expanding cultural, political, and economic connections between people around the world. One measure of this is the increased buying and selling of goods, services, and assets across national borders—in other words, international trade and financial capital flows.

Globalization has occurred for a number of reasons. Improvements in shipping, as illustrated by the container ship in Figure 1.10, and air cargo have driven down transportation costs. Innovations in computing and telecommunications have made it easier and cheaper to manage long-distance economic connections of production and sales. Many valuable products and services in the modern economy can take the form of information—for example: computer software; financial advice; travel planning; music, books and movies; and blueprints for designing a building. These products and many others can be transported over telephones and computer networks at ever-lower costs. Finally, international agreements and treaties between countries have encouraged greater trade.

Table 1.2 presents one measure of globalization. It shows the percentage of domestic economic production that was exported for a selection of countries from 2010 to 2015, according to an entity known as The World Bank. Exports are the goods and services that one produces domestically and sells abroad. Imports are the goods and services that one produces abroad and then sells domestically. Gross domestic product (GDP) measures the size of total production in an economy. Thus, the ratio of exports divided by GDP measures what share of a country's total economic production is sold in other countries.

Country	2010	2011	2012	2013	2014	2015
Higher Income Countries						
United States	12.4	13.6	13.6	13.5	13.5	12.6
Belgium	76.2	81.4	82.2	82.8	84.0	84.4
Canada	29.1	30.7	30.0	30.1	31.7	31.5
France	26.0	27.8	28.1	28.3	29.0	30.0
Middle Income Countries						
Brazil	10.9	11.9	12.6	12.6	11.2	13.0
Mexico	29.9	31.2	32.6	31.7	32.3	35.3
South Korea	49.4	55.7	56.3	53.9	50.3	45.9
Lower Income Countries						
Chad	36.8	38.9	36.9	32.2	34.2	29.8
China	29.4	28.5	27.3	26.4	23.9	22.4
India	22.0	23.9	24.0	24.8	22.9	-
Nigeria	25.3	31.3	31.4	18.0	18.4	-

Table 1.2 The Extent of Globalization (exports/GDP) (Source: http://databank.worldbank.org/data/)

In recent decades, the export/GDP ratio has generally risen, both worldwide and for the U.S. economy. Interestingly, the share of U.S. exports in proportion to the U.S. economy is well below the global average, in part because large economies like the United States can contain more of the division of labor inside their national borders. However, smaller economies like Belgium, Korea, and Canada need to trade across their borders with other countries to take full advantage of division of labor, specialization, and economies of scale. In this sense, the enormous U.S. economy is less affected by globalization than most other countries.

Table 1.2 indicates that many medium and low income countries around the world, like Mexico and China, have also experienced a surge of globalization in recent decades. If an astronaut in orbit could put on special glasses that make all economic transactions visible as brightly colored lines and look down at Earth, the astronaut would see the planet covered with connections.

Despite the rise in globalization over the last few decades, in recent years we've seen significant pushback against globalization from people across the world concerned about loss of jobs, loss of political sovereignty, and increased economic inequality. Prominent examples of this pushback include the 2016 vote in Great Britain to exit the European Union (i.e. Brexit), and the election of Donald J. Trump for President of the United States.

Hopefully, you now have an idea about economics. Before you move to any other chapter of study, be sure to read the very important appendix to this chapter called The Use of Mathematics in Principles of Economics. It is essential that you learn more about how to read and use models in economics.

Bring It Home

Information Overload in the Information Age

The world provides nearly instant access to a wealth of information. Consider that as recently as the late 1970s, the *Farmer's Almanac*, along with the Weather Bureau of the U.S. Department of Agriculture, were the primary sources American farmers used to determine when to plant and harvest their crops. Today, these decisions are driven by data. Farmers access detailed data streams driven by global positioning systems, historical rainfall patterns, and complex weather monitoring services. They combine this information with crop yield data and soil quality measurements from prior years. Maximizing production efficiently can mean the difference between a farm that remains profitable and one that may need to sell its land, and data helps eliminate guesswork.

Information helps us make decisions as simple as what to wear today to how many reporters the media should send to cover an event. Each of these decisions is an economic decision. After all, resources are scarce. If the media send ten reporters to cover an announcement, they are not available to cover other stories or complete other tasks. Information provides the necessary knowledge to make the best possible decisions on how to utilize scarce resources. Welcome to the world of economics!

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1.6: Key Terms

circular flow diagram
a diagram that views the economy as consisting of households and firms interacting in a goods and services market and a labor market

command economy
an economy where economic decisions are passed down from government authority and where the government owns the resources

division of labor
the way in which different workers divide required tasks to produce a good or service

economics
the study of how humans make choices under conditions of scarcity

economies of scale
when the average cost of producing each individual unit declines as total output increases

exports
products (goods and services) made domestically and sold abroad

fiscal policy
economic policies that involve government spending and taxes

globalization
the trend in which buying and selling in markets have increasingly crossed national borders

goods and services market
a market in which firms are sellers of what they produce and households are buyers

gross domestic product (GDP)
measure of the size of total production in an economy

imports
products (goods and services) made abroad and then sold domestically

labor market
the market in which households sell their labor as workers to business firms or other employers

macroeconomics
the branch of economics that focuses on broad issues such as growth, unemployment, inflation, and trade balance

market
interaction between potential buyers and sellers; a combination of demand and supply

market economy
an economy where economic decisions are decentralized, private individuals own resources, and businesses supply goods and services based on demand

microeconomics
the branch of economics that focuses on actions of particular agents within the economy, like households, workers, and business firms

model

see theory

monetary policy

policy that involves altering the level of interest rates, the availability of credit in the economy, and the extent of borrowing

private enterprise

system where private individuals or groups of private individuals own and operate the means of production (resources and businesses)

scarcity

when human wants for goods and services exceed the available supply

specialization

when workers or firms focus on particular tasks for which they are well-suited within the overall production process

theory

a representation of an object or situation that is simplified while including enough of the key features to help us understand the object or situation

traditional economy

typically an agricultural economy where things are done the same as they have always been done

underground economy

a market where the buyers and sellers make transactions in violation of one or more government regulations

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1.7: Key Concepts and Summary

1.1 What Is Economics, and Why Is It Important?

Economics seeks to solve the problem of scarcity, which is when human wants for goods and services exceed the available supply. A modern economy displays a division of labor, in which people earn income by specializing in what they produce and then use that income to purchase the products they need or want. The division of labor allows individuals and firms to specialize and to produce more for several reasons: a) It allows the agents to focus on areas of advantage due to natural factors and skill levels; b) It encourages the agents to learn and invent; c) It allows agents to take advantage of economies of scale. Division and specialization of labor only work when individuals can purchase what they do not produce in markets. Learning about economics helps you understand the major problems facing the world today, prepares you to be a good citizen, and helps you become a well-rounded thinker.

1.2 Microeconomics and Macroeconomics

Microeconomics and macroeconomics are two different perspectives on the economy. The microeconomic perspective focuses on parts of the economy: individuals, firms, and industries. The macroeconomic perspective looks at the economy as a whole, focusing on goals like growth in the standard of living, unemployment, and inflation. Macroeconomics has two types of policies for pursuing these goals: monetary policy and fiscal policy.

1.3 How Economists Use Theories and Models to Understand Economic Issues

Economists analyze problems differently than do other disciplinary experts. The main tools economists use are economic theories or models. A theory is not an illustration of the answer to a problem. Rather, a theory is a tool for determining the answer.

1.4 How To Organize Economies: An Overview of Economic Systems

We can organize societies as traditional, command, or market-oriented economies. Most societies are a mix. The last few decades have seen globalization evolve as a result of growth in commercial and financial networks that cross national borders, making businesses and workers from different economies increasingly interdependent.

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CHAPTER OVERVIEW

2: Choice in a World of Scarcity

This chapter will continue our discussion of scarcity and the economic way of thinking by first introducing three critical concepts: opportunity cost, marginal decision making, and diminishing returns. Later, it will consider whether the economic way of thinking accurately describes either how choices *are* made or how they *should* be made.

2.1: Introduction to Choice in a World of Scarcity

2.2: How Individuals Make Choices Based on Their Budget Constraint

2.3: The Production Possibilities Frontier and Social Choices

2.4: Confronting Objections to the Economic Approach

2.5: Key Terms

2.6: Key Concepts and Summary

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2.1: Introduction to Choice in a World of Scarcity



Figure 2.1 Choices and Tradeoffs In general, the higher the degree, the higher the salary, so why aren't more people pursuing higher degrees? The short answer: choices and tradeoffs. (Credit: modification of "College of DuPage Commencement 2018 107" by COD Newsroom/Flickr, CC BY 2.0)

Chapter Objectives

In this chapter, you will learn about:

- How Individuals Make Choices Based on Their Budget Constraint
- The Production Possibilities Frontier and Social Choices
- Confronting Objections to the Economic Approach

Bring It Home

Choices ... to What Degree?

Does your level of education impact earning? Let's look at some data from the Bureau of Labor Statistics (BLS). In 2020, among full-time wage and salary workers, median weekly earnings for those with a master's degree were $1,545. Multiply this average by 52 weeks, and you get average annual earnings of $80,340. Compare that to the median weekly earnings for full-time workers aged 25 and over with just a bachelor's degree: $1,305 weekly and $67,860 a year. What about those with no higher than a high school diploma in 2020? They earn an average of just $781 weekly and $40,612 over 12 months. In other words, data from the BLS indicates that receiving a bachelor's degree boosts earnings by 67% over what workers would have

earned if they only obtained a high school diploma, and a master's degree yields average earnings that are nearly double those of workers with a high school diploma.

Given these statistics, we might expect many people to choose to go to college and at least earn a bachelor's degree. Assuming that people want to improve their material well-being, it seems like they would make those choices that provide them with the greatest opportunity to consume goods and services. As it turns out, the analysis is not nearly as simple as this. In fact, in 2019, the BLS reported that while just over 90% of the population aged 25 and over in the United States had a high school diploma, only 36% of those aged 25 and over had a bachelor's or higher degree, and only 13.5% had earned a master's or higher degree.

This brings us to the subject of this chapter: why people make the choices they make and how economists explain those choices.

You will learn quickly when you examine the relationship between economics and scarcity that choices involve tradeoffs. Every choice has a cost.

In 1968, the Rolling Stones recorded "You Can't Always Get What You Want." Economists chuckled, because they had been singing a similar tune for decades. English economist Lionel Robbins (1898–1984), in his *Essay on the Nature and Significance of Economic Science* in 1932, described not always getting what you want in this way:

> *The time at our disposal is limited. There are only twenty-four hours in the day. We have to choose between the different uses to which they may be put. ... Everywhere we turn, if we choose one thing we must relinquish others which, in different circumstances, we would wish not to have relinquished. Scarcity of means to satisfy given ends is an almost ubiquitous condition of human nature.*

Because people live in a world of scarcity, they cannot have all the time, money, possessions, and experiences they wish. Neither can society.

This chapter will continue our discussion of scarcity and the economic way of thinking by first introducing three critical concepts: opportunity cost, marginal decision making, and diminishing returns. Later, it will consider whether the economic way of thinking accurately describes either how we *make* choices and how we *should* make them.

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2.2: How Individuals Make Choices Based on Their Budget Constraint

Learning Objectives

By the end of this section, you will be able to:

- Calculate and graph budget constraints
- Explain opportunity sets and opportunity costs
- Evaluate the law of diminishing marginal utility
- Explain how marginal analysis and utility influence choices

Consider the typical consumer's budget problem. Consumers have a limited amount of income to spend on the things they need and want. Suppose Alphonso has $10 in spending money each week that he can allocate between bus tickets for getting to work and the burgers that he eats for lunch. Burgers cost $2 each, and bus tickets are 50 cents each. We can see Alphonso's budget problem in Figure 2.2.

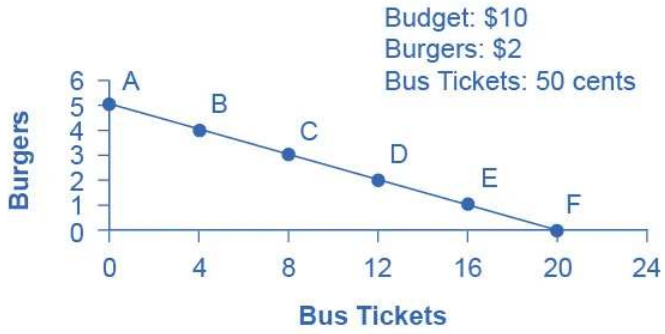


Figure 2.2 The Budget Constraint: Alphonso's Consumption Choice Opportunity Frontier Each point on the budget constraint represents a combination of burgers and bus tickets whose total cost adds up to Alphonso's budget of $10. The relative price of burgers and bus tickets determines the slope of the budget constraint. All along the budget set, giving up one burger means gaining four bus tickets.

The vertical axis in the figure shows burger purchases and the horizontal axis shows bus ticket purchases. If Alphonso spends all his money on burgers, he can afford five per week. ($10 per week/$2 per burger = 5 burgers per week.) However, if he does this, he will not be able to afford any bus tickets. Point A in the figure shows the choice (zero bus tickets and five burgers). Alternatively, if Alphonso 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. Point F shows this alternative choice (20 bus tickets and zero burgers).

If we connect all the points between A and F, we get Alphonso's budget constraint. This indicates all the combination of burgers and bus tickets Alphonso can afford, given the price of the two goods and his budget amount.

If Alphonso is like most people, he will choose some combination that includes both bus tickets and burgers. That is, he will choose some combination on the budget constraint that is between points A and F. Every point on (or inside) the constraint shows a combination of burgers and bus tickets that Alphonso can afford. Any point outside the constraint is not affordable, because it would cost more money than Alphonso has in his budget.

The budget constraint clearly shows the tradeoff Alphonso faces in choosing between burgers and bus tickets. Suppose he is currently at point D, where he can afford 12 bus tickets and two burgers. What would it cost Alphonso 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 Alphonso have to give up to get one more burger, while staying within his budget? Since bus tickets cost 50 cents, Alphonso would have to give up four to afford one more burger. That is the true cost to Alphonso.

The Concept of Opportunity Cost

Economists use the term opportunity cost to indicate what people must give up to obtain what they desire. 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. For Alphonso, the opportunity cost of a burger is the four bus tickets he would have to give up. He would decide whether or not to choose the burger depending on whether the value of the burger exceeds the value of the forgone alternative—in this case, bus tickets. Since people must choose, they inevitably face tradeoffs in which they have to give up things they desire to obtain other things they desire more.

Link It Up

View this website for an example of opportunity cost—paying someone else to wait in line for you.

A fundamental principle of economics is that every choice has an opportunity cost. If you sleep through your economics class, the opportunity cost is the learning you miss from not attending class. 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 and part of human existence.

The following Work It Out feature shows a step-by-step analysis of a budget constraint calculation. Read through it to understand another important concept—slope—that we further explain in the appendix The Use of Mathematics in Principles of Economics.

Work It Out

Understanding Budget Constraints

Budget constraints are easy to understand if you apply a little math. The appendix The Use of Mathematics in Principles of Economics explains all the math you are likely to need in this book. Therefore, if math is not your strength, you might want to take a look at the appendix.

Step 1: The equation for any budget constraint is:

Budget=P1 × Q1 + P2× Q2Budget=P1 × Q1 + P2× Q2

where P and Q are the price and quantity of items purchased (which we assume here to be two items) and Budget is the amount of income one has to spend.

Step 2. Apply the budget constraint equation to the scenario. In Alphonso's case, this works out to be:

Budget= P1 × Q1 + P2× Q2 $10 budget=$2 per burger × quantity of burgers + $0.50 per bus ticket × quantity of bus tickets$10=$2 × Qburgers + $0.50 × Qbus ticketsBudget= P1 × Q1 + P2× Q2 $10 budget=$2 per burger × quantity of burgers + $0.50 per bus ticket × quantity of bus tickets$10=$2 × Qburgers + $0.50 × Qbus tickets

Step 3. Using a little algebra, we can turn this into the familiar equation of a line:

y = b + mxy = b + mx

For Alphonso, this is:

$10 = $2 × Qburgers + $0.50 × Qbus tickets$10 = $2 × Qburgers + $0.50 × Qbus tickets

Step 4. Simplify the equation. Begin by multiplying both sides of the equation by 2:

2 × 10 = 2 × 2 × Qburgers + 2 × 0.5 × Qbus tickets 20 = 4 × Qburgers + 1 × Qbus tickets2 × 10 = 2 × 2 × Qburgers + 2 × 0.5 × Qbus tickets 20 = 4 × Qburgers + 1 × Qbus tickets

Step 5. Subtract one bus ticket from both sides:

20 – Qbus tickets = 4 × Qburgers20 – Qbus tickets = 4 × Qburgers

Divide each side by 4 to yield the answer:

5 – 0.25 × Qbus tickets = QburgersorQburgers = 5 – 0.25 × Qbus tickets5 – 0.25 × Qbus tickets = QburgersorQburgers = 5 – 0.25 × Qbus tickets

Step 6. Notice that this equation fits the budget constraint in Figure 2.2. The vertical intercept is 5 and the slope is –0.25, just as the equation says. If you plug 20 bus tickets into the equation, you get 0 burgers. If you plug other numbers of bus tickets into the equation, you get the results (see Table 2.1), which are the points on Alphonso's budget constraint.

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

Table 2.1

Step 7. Notice that the slope of a budget constraint always shows the opportunity cost of the good which is on the horizontal axis. For Alphonso, the slope is −0.25, indicating that for every bus ticket he buys, he must give up 1/4 burger. To phrase it differently, for every four tickets he buys, Alphonso must give up 1 burger.

There are two important observations here. First, the algebraic sign of the slope is negative, which means that the only way to get more of one good is to give up some of the other. Second, we define the slope as the price of bus tickets (whatever is on the horizontal axis in the graph) divided by the price of burgers (whatever is on the vertical axis), in this case $0.50/$2 = 0.25. If you want to determine the opportunity cost quickly, just divide the two prices.

Identifying Opportunity Cost

In many cases, it is reasonable to refer to the opportunity cost as the price. If your cousin buys a new bicycle for $300, then $300 measures the amount of "other consumption" that he has forsaken. For practical purposes, there may be no special need to identify the specific alternative product or products that he could have bought with that $300, but sometimes the price as measured in dollars may not accurately capture the true opportunity cost. This problem can loom especially large when costs of time are involved.

For example, consider a boss who decides that all employees will attend a two-day retreat to "build team spirit." The out-of-pocket monetary cost of the event may involve hiring an outside consulting firm to run the retreat, as well as room and board for all participants. However, an opportunity cost exists as well: during the two days of the retreat, none of the employees are doing any other work.

Attending college is another case where the opportunity cost exceeds the monetary cost. The out-of-pocket costs of attending college include tuition, books, room and board, and other expenses. However, in addition, during the hours that you are attending class and studying, it is impossible to work at a paying job. Thus, college imposes both an out-of-pocket cost and an opportunity cost of lost earnings.

Clear It Up

What is the opportunity cost associated with increased airport security measures?

After the terrorist plane hijackings on September 11, 2001, many steps were proposed to improve air travel safety. For example, 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, could cost another $2 billion.

> However, the single biggest cost of greater airline security does not involve spending money. It is the opportunity cost of additional waiting time at the airport. According to the United States Department of Transportation (DOT), there were 895.5 million systemwide (domestic and international) scheduled service passengers in 2015. 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 high-paid business people, conservative estimates set the average price of time for air travelers at $20 per hour. By these back-of-the-envelope calculations, the opportunity cost of delays in airports could be as much as 800 million × 0.5 hours × $20/hour, or $8 billion per year. Clearly, the opportunity costs of waiting time can be just as important as costs that involve direct spending.

In some cases, realizing the opportunity cost can alter 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 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 days a year × $5 per day equals $1,250, the cost, perhaps, of a decent vacation. If you describe the opportunity cost as “a nice vacation” instead of “$5 a day,” you might make different choices.

Marginal Decision-Making and Diminishing Marginal Utility

The budget constraint framework helps to emphasize that most choices in the real world are not about getting all of one thing or all of another; that is, they are not about choosing either the point at one end of the budget constraint or else the point all the way at the other end. Instead, most choices involve marginal analysis, which means examining the benefits and costs of choosing a little more or a little less of a good. People naturally compare costs and benefits, but often we look at total costs and total benefits, when the optimal choice necessitates comparing how costs and benefits change from one option to another. You might think of marginal analysis as “change analysis.” Marginal analysis is used throughout economics.

We now turn to the notion of utility. People desire goods and services for the satisfaction or utility those goods and services provide. Utility, as we will see in the chapter on Consumer Choices, is subjective but that does not make it less real. Economists typically assume that the more of some good one consumes (for example, slices of pizza), the more utility one obtains. At the same time, the utility a person receives from consuming the first unit of a good is typically more than the utility received from consuming the fifth or the tenth unit of that same good. When Alphonso chooses between burgers and bus tickets, for example, the first few bus rides that he chooses might provide him with a great deal of utility—perhaps they help him get to a job interview or a doctor’s appointment. However, later bus rides might provide much less utility—they may only serve to kill time on a rainy day. Similarly, the first burger that Alphonso chooses to buy may be on a day when he missed breakfast and is ravenously hungry. However, if Alphonso has multiple burgers every day, the last few burgers may taste pretty boring. The general pattern that consumption of the first few units of any good tends to bring a higher level of utility to a person than consumption of later units is a common pattern. Economists refer to this pattern as the law of diminishing marginal utility, which means that as a person receives more of a good, the additional (or marginal) utility from each additional unit of the good declines. In other words, the first slice of pizza brings more satisfaction than the sixth.

The law of diminishing marginal utility explains why people and societies rarely make all-or-nothing choices. You would not say, “My favorite food is ice cream, so I will eat nothing but ice cream from now on.” Instead, even if you get a very high level of utility from your favorite food, if you ate it exclusively, the additional or marginal utility from those last few servings would not be very high. Similarly, most workers do not say: “I enjoy leisure, so I’ll never work.” Instead, workers recognize that even though some leisure is very nice, a combination of all leisure and no income is not so attractive. The budget constraint framework suggests that when people make choices in a world of scarcity, they will use marginal analysis and think about whether they would prefer a little more or a little less.

A rational consumer would only purchase additional units of some product as long as the marginal utility exceeds the opportunity cost. Suppose Alphonso moves down his budget constraint from Point A to Point B to Point C and further. As he consumes more bus tickets, the marginal utility of bus tickets will diminish, while the opportunity cost, that is, the marginal utility of foregone burgers, will increase. Eventually, the opportunity cost will exceed the marginal utility of an additional bus ticket. If Alphonso is

rational, he won't purchase more bus tickets once the marginal utility just equals the opportunity cost. While we can't (yet) say exactly how many bus tickets Alphonso will buy, that number is unlikely to be the most he can afford, 20.

Sunk Costs

In the budget constraint framework, all decisions involve what will happen next: that is, what quantities of goods will you consume, how many hours will you work, or how much will you save. These decisions do not look back to past choices. Thus, the budget constraint framework assumes that sunk costs, which are costs that were incurred in the past and cannot be recovered, should not affect the current decision.

Consider the case of Selena, who pays $8 to see a movie, but after watching the film for 30 minutes, she knows that it is truly terrible. Should she stay and watch the rest of the movie because she paid for the ticket, or should she leave? The money she spent is a sunk cost, and unless the theater manager is sympathetic, Selena will not get a refund. However, staying in the movie still means paying an opportunity cost in time. Her choice is whether to spend the next 90 minutes suffering through a cinematic disaster or to do something—anything—else. The lesson of sunk costs is to forget about the money and time that is irretrievably gone and instead to focus on the marginal costs and benefits of current and future options.

For people and firms alike, dealing with sunk costs can be frustrating. It often means admitting an earlier error in judgment. Many firms, for example, find it hard to give up on a new product that is doing poorly because they spent so much money in creating and launching the product. However, the lesson of sunk costs is to ignore them and make decisions based on what will happen in the future.

From a Model with Two Goods to One of Many Goods

The budget constraint diagram containing just two goods, like most models used in this book, is not realistic. After all, in a modern economy people choose from thousands of goods. However, thinking about a model with many goods is a straightforward extension of what we discussed here. Instead of drawing just one budget constraint, showing the tradeoff between two goods, you can draw multiple budget constraints, showing the possible tradeoffs between many different pairs of goods. In more advanced classes in economics, you would use mathematical equations that include many possible goods and services that can be purchased, together with their quantities and prices, and show how the total spending on all goods and services is limited to the overall budget available. The graph with two goods that we presented here clearly illustrates that every choice has an opportunity cost, which is the point that does carry over to the real world.

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2.3: The Production Possibilities Frontier and Social Choices

Learning Objectives

By the end of this section, you will be able to:

- Interpret production possibilities frontier graphs
- Contrast a budget constraint and a production possibilities frontier
- Explain the relationship between a production possibilities frontier and the law of diminishing returns
- Contrast productive efficiency and allocative efficiency
- Define comparative advantage

Just as individuals cannot have everything they want and must instead make choices, society as a whole cannot have everything it might want, either. This section of the chapter will explain the constraints society faces, using a model called the production possibilities frontier (PPF). There are more similarities than differences between individual choice and social choice. As you read this section, focus on the similarities.

Because society has limited resources (e.g., labor, land, capital, raw materials) at any point in time, there is a limit to the quantities of goods and services it can produce. Suppose a society desires two products, healthcare and education. The production possibilities frontier in Figure 2.3 illustrates this situation.

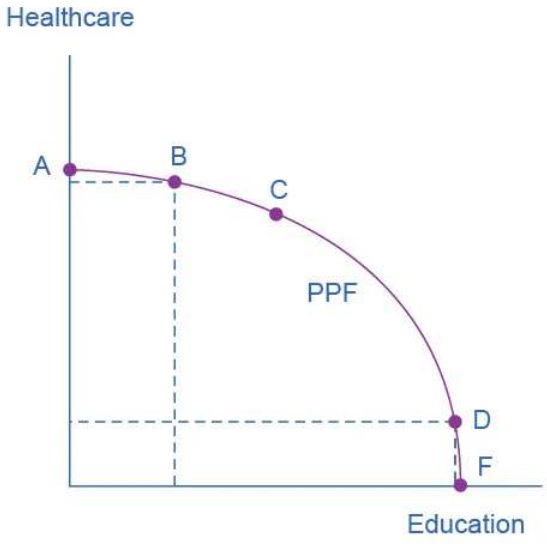


Figure 2.3 A Healthcare vs. Education Production Possibilities Frontier This production possibilities frontier shows a tradeoff between devoting social resources to healthcare and devoting them to education. At A all resources go to healthcare and at B, most go to healthcare. At D most resources go to education, and at F, all go to education.

Figure 2.3 shows healthcare on the vertical axis and education on the horizontal axis. If the society were to allocate all of its resources to healthcare, it could produce at point A. However, 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, the society could choose to produce any combination of healthcare and education on the production possibilities frontier. In effect, the production possibilities frontier plays the same role for society as the budget constraint plays for Alphonso. 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 is 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 healthcare. That is the tradeoff society faces. Suppose it considers moving from point B to point C. What would the opportunity cost be for the additional education? The opportunity cost would be the healthcare society has to forgo. Just as with Alphonso's budget constraint, the slope of the production

possibilities frontier shows the opportunity cost. By now you might be saying, “Hey, this PPF is sounding like the budget constraint.” If so, read the following Clear It Up feature.

Clear It Up

What’s the difference between a budget constraint and a PPF?

There are two major differences between a budget constraint and a production possibilities frontier. The first is the fact that the budget constraint is a straight line. This is because its slope is given by the relative prices of the two goods, which from the point of view of an individual consumer, are fixed, so the slope doesn't change. In contrast, the PPF has a curved shape because of the law of the diminishing returns. Thus, the slope is different at various points on the PPF. The second major difference is the absence of specific numbers on the axes of the PPF. There are no specific numbers because we do not know the exact amount of resources this imaginary economy has, nor do we know how many resources it takes to produce healthcare and how many resources it takes to produce education. If this were a real world example, that data would be available.

Whether or not we have specific numbers, conceptually we can measure the opportunity cost of additional education as society moves from point B to point C on the PPF. We measure the additional education by the horizontal distance between B and C. The foregone healthcare is given by the vertical distance between B and C. The slope of the PPF between B and C is (approximately) the vertical distance (the “rise”) over the horizontal distance (the “run”). This is the opportunity cost of the additional education.

The PPF and the Law of Increasing Opportunity Cost

The budget constraints that we presented earlier in this chapter, showing individual choices about what quantities of goods to consume, were all straight lines. The reason for these straight lines was that the relative prices of the two goods in the consumption budget constraint determined the slope of the budget constraint. However, we drew the production possibilities frontier for healthcare and education as a curved line. Why does the PPF have a different shape?

To understand why the PPF is curved, start by considering point A at the top left-hand side of the PPF. At point A, all available resources are devoted to healthcare and none are left for education. This situation would be extreme and even ridiculous. For example, children are seeing a doctor every day, whether they are 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 healthcare to education, so that the economy is at point B instead of point A. Diverting some resources away from A to B causes relatively little reduction in health because the last few marginal dollars going into healthcare services are not producing much additional gain in health. However, putting those marginal dollars into education, which is completely without resources at point A, can produce relatively large gains. For this reason, the shape of the PPF from A to B is relatively flat, representing a relatively small drop-off in health and a relatively large gain in education.

Now consider the other end, at the lower right, of the production possibilities frontier. Imagine that society starts at choice D, which is devoting nearly all resources to education and very few to healthcare, and moves to point F, which is devoting *all* spending to education and none to healthcare. For the sake of concreteness, you can imagine that in the movement from D to F, the last few doctors must become high school science teachers, the last few nurses must become school librarians rather than dispensers of vaccinations, and the last few emergency rooms are turned into kindergartens. The gains to education from adding these last few resources to education are very small. However, the opportunity cost lost to health will be fairly large, and thus the slope of the PPF between D and F is steep, showing a large drop in health for only a small gain in education.

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 for education 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 common enough that economists have given it a name: the law of increasing opportunity cost, which holds that as production of a good or service increases, the marginal opportunity cost of producing it increases as well. This happens because some resources are better suited for producing certain goods and services instead of others. When government spends a certain

amount more on reducing crime, for example, the original increase in opportunity cost of reducing crime could be relatively small. However, additional increases typically cause relatively larger increases in the opportunity cost of reducing crime, and paying for enough police and security to reduce crime to nothing at all would be a tremendously high opportunity cost.

The curvature of the production possibilities frontier shows that as we add more resources to education, moving from left to right along the horizontal axis, the original increase in opportunity cost is fairly small, but gradually increases. Thus, the slope of the PPF is relatively flat near the vertical-axis intercept. Conversely, as we add more resources to healthcare, moving from bottom to top on the vertical axis, the original declines in opportunity cost are fairly large, but again gradually diminish. Thus, the slope of the PPF is relatively steep near the horizontal-axis intercept. In this way, the law of increasing opportunity cost produces the outward-bending shape of the production possibilities frontier.

Productive Efficiency and Allocative Efficiency

The study of economics does not presume to tell a society what choice it should make along its production possibilities frontier. In a market-oriented economy with a democratic government, the choice will involve a mixture of decisions by individuals, firms, and government. However, economics can point out that some choices are unambiguously better than others. This observation is based on the concept of efficiency. In everyday usage, efficiency refers to lack of waste. An inefficient machine operates at high cost, while an efficient machine operates at lower cost, because it is not wasting energy or materials. An inefficient organization operates with long delays and high costs, while an efficient organization meets schedules, is focused, and performs within budget.

The production possibilities frontier can illustrate two kinds of efficiency: productive efficiency and allocative efficiency. Figure 2.4 illustrates these ideas using a production possibilities frontier between healthcare and education.

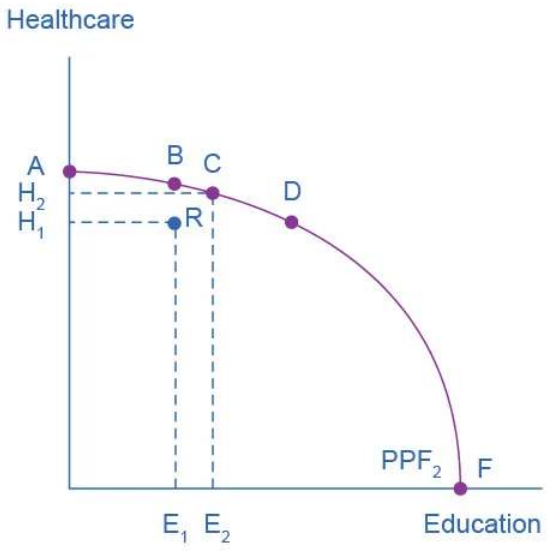


Figure 2.4 Productive and Allocative Efficiency Productive efficiency means it is impossible to produce more of one good without decreasing the quantity that is produced of another good. Thus, all choices along a given PPF like B, C, and D display productive efficiency, but R does not. Allocative efficiency means that the particular mix of goods being produced—that is, the specific choice along the production possibilities frontier—represents the allocation that society most desires.

Productive efficiency means that, given the available inputs and technology, it is impossible to produce more of one good without decreasing the quantity that is produced of another good. All choices on the PPF in Figure 2.4, including A, B, C, D, and F, display productive efficiency. As a firm moves from any one of these choices to any other, either healthcare increases and education decreases or vice versa. However, any choice inside the production possibilities frontier is productively inefficient and wasteful because it is possible to produce more of one good, the other good, or some combination of both goods.

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 healthcare on the vertical axis is also higher at point C than point R (H_2 is great than H_1).

We can show the particular mix of goods and services produced—that is, the specific combination of selected healthcare and education along the production possibilities frontier—as a ray (line) from the origin to a specific point on the PPF. Output mixes that had more healthcare (and less education) would have a steeper ray, while those with more education (and less healthcare) would have a flatter ray.

Allocative efficiency means that the particular combination of goods and services on the production possibility curve that a society produces represents the combination that society most desires. How to determine what a society desires can be a controversial question, and is usually a discussion in political science, sociology, and philosophy classes as well as in economics. At its most basic, allocative efficiency means producers supply the quantity of each product that consumers demand. Only one of the productively efficient choices will be the allocatively efficient choice for society as a whole.

Why Society Must Choose

In Welcome to Economics! we learned that every society faces the problem of scarcity, where limited resources conflict with unlimited needs and wants. The production possibilities curve illustrates the choices involved in this dilemma.

Every economy faces two situations in which it may be able to expand 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. In addition, over time, improvements in technology can increase the level of production with given resources, and hence push out the PPF.

However, improvements in productive efficiency take time to discover and implement, and economic growth happens only gradually. Thus, a society must choose between tradeoffs in the present. 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. However, 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.

The PPF and Comparative Advantage

While every society must choose how much of each good or service it should produce, it does not 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 curvature of a country's PPF gives us information about the tradeoff 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 US and Brazil, need to decide how much they will produce of two crops: sugar cane and wheat. Due to its climatic conditions, Brazil can produce quite a bit of sugar cane per acre but not much wheat. Conversely, the U.S. can produce large amounts 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. We illustrate this by the PPFs of the two countries in Figure 2.5.

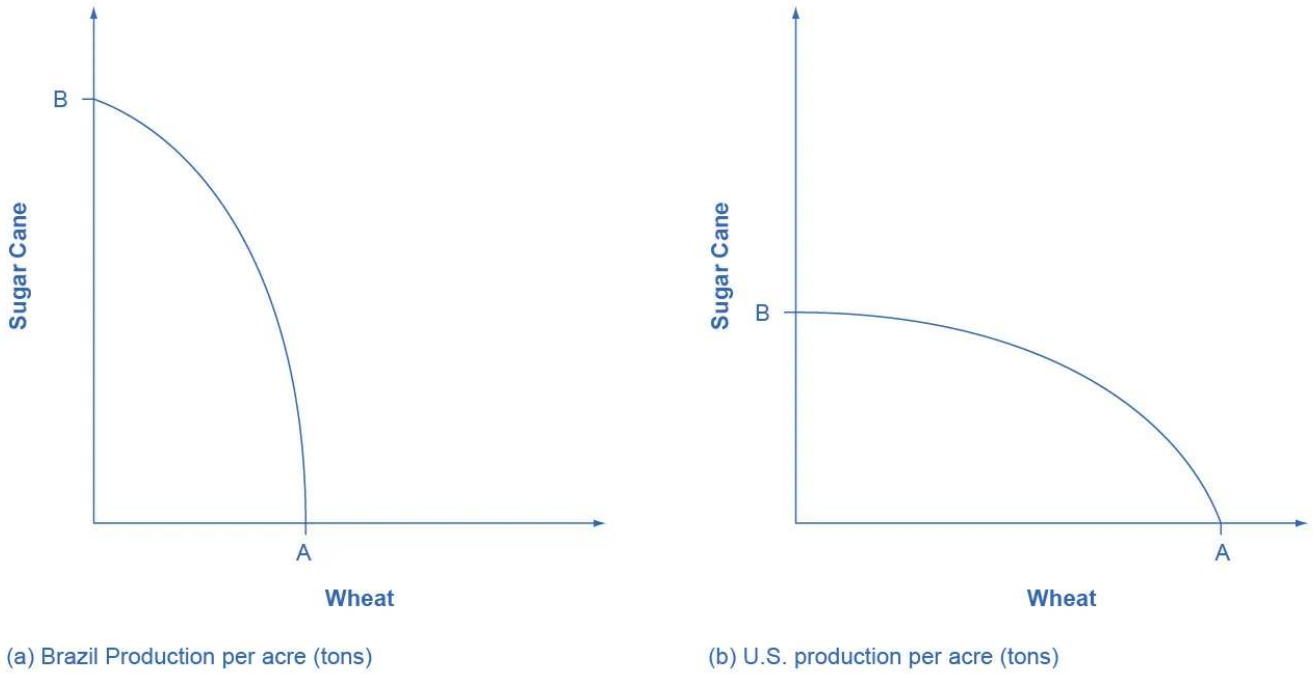


Figure 2.5 Production Possibility Frontier for the U.S. and Brazil The U.S. PPF is flatter than the Brazil PPF implying that the opportunity cost of wheat in terms of sugar cane is lower in the U.S. than in Brazil. Conversely, the opportunity cost of sugar cane is lower in Brazil. The U.S. has comparative advantage in wheat and Brazil has comparative advantage in sugar cane.

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. Comparative advantage is not the same as absolute advantage, which is when a country can produce more of a good. In our example, Brazil has an absolute advantage in sugar cane and the U.S. has an absolute advantage in wheat. One can easily see this with a simple observation of the extreme production points in the PPFs of the two countries. If Brazil devoted all of its resources to producing wheat, it would be producing at point A. If however it had devoted all of its resources to producing sugar cane instead, it would be producing a much larger amount than the U.S., at point B.

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 chapter 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 do not have comparative advantage. With trade, manufacturers produce goods where the opportunity cost is lowest, so total production increases, benefiting both trading parties.

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2.4: Confronting Objections to the Economic Approach

Learning Objectives

By the end of this section, you will be able to:

- Analyze arguments against economic approaches to decision-making
- Interpret a tradeoff diagram
- Contrast normative statements and positive statements

It is one thing to understand the economic approach to decision-making and another thing to feel comfortable applying it. The sources of discomfort typically fall into two categories: that people do not act in the way that fits the economic way of thinking, and that even if people did act that way, they should try not to. Let's consider these arguments in turn.

First Objection: People, Firms, and Society Do Not Act Like This

The economic approach to decision-making seems to require more information than most individuals possess and more careful decision-making than most individuals actually display. After all, do you or any of your friends draw a budget constraint and mutter to yourself about maximizing utility before you head to the shopping mall? Do members of the U.S. Congress contemplate production possibilities frontiers before they vote on the annual budget? The messy ways in which people and societies operate somehow doesn't look much like neat budget constraints or smoothly curving production possibilities frontiers.

However, the economics approach can be a useful way to analyze and understand the tradeoffs of economic decisions. To appreciate this point, imagine for a moment that you are playing basketball, dribbling to the right, and throwing a bounce-pass to the left to a teammate who is running toward the basket. A physicist or engineer could work out the correct speed and trajectory for the pass, given the different movements involved and the weight and bounciness of the ball. However, when you are playing basketball, you do not perform any of these calculations. You just pass the ball, and if you are a good player, you will do so with high accuracy.

Someone might argue: "The scientist's formula of the bounce-pass requires a far greater knowledge of physics and far more specific information about speeds of movement and weights than the basketball player actually has, so it must be an unrealistic description of how basketball passes actually occur." This reaction would be wrongheaded. The fact that a good player can throw the ball accurately because of practice and skill, without making a physics calculation, does not mean that the physics calculation is wrong.

Similarly, from an economic point of view, someone who shops for groceries every week has a great deal of practice with how to purchase the combination of goods that will provide that person with utility, even if the shopper does not phrase decisions in terms of a budget constraint. Government institutions may work imperfectly and slowly, but in general, a democratic form of government feels pressure from voters and social institutions to make the choices that are most widely preferred by people in that society. Thus, when thinking about the economic actions of groups of people, firms, and society, it is reasonable, as a first approximation, to analyze them with the tools of economic analysis. For more on this, read about behavioral economics in the chapter on Consumer Choices.

Second Objection: People, Firms, and Society Should Not Act This Way

The economics approach portrays people as self-interested. For some critics of this approach, even if self-interest is an accurate description of how people behave, these behaviors are not moral. Instead, the critics argue that people should be taught to care more deeply about others. Economists offer several answers to these concerns.

First, economics is not a form of moral instruction. Rather, it seeks to describe economic behavior as it actually exists. Philosophers draw a distinction between positive statements, which describe the world as it is, and normative statements, which describe how the world should be. Positive statements are factual. They may be true or false, but we can test them, at least in principle. Normative statements are subjective questions of opinion. We cannot test them since we cannot prove opinions to be true or false. They just are opinions based on one's values. For example, an economist could analyze a proposed subway system in a certain city. If the expected benefits exceed the costs, he concludes that the project is worthy—an example of positive analysis. Another economist

argues for extended unemployment compensation during the COVID-19 pandemic because a rich country like the United States should take care of its less fortunate citizens—an example of normative analysis.

Even if the line between positive and normative statements is not always crystal clear, economic analysis does try to remain rooted in the study of the actual people who inhabit the actual economy. Fortunately however, the assumption that individuals are purely self-interested is a simplification about human nature. In fact, we need to look no further than to Adam Smith, the very father of modern economics to find evidence of this. The opening sentence of his book, *The Theory of Moral Sentiments*, puts it very clearly: "How selfish soever man may be supposed, there are evidently some principles in his nature, which interest him in the fortune of others, and render their happiness necessary to him, though he derives nothing from it except the pleasure of seeing it." Clearly, individuals are both self-interested and altruistic.

Second, we can label self-interested behavior and profit-seeking with other names, such as personal choice and freedom. The ability to make personal choices about buying, working, and saving is an important personal freedom. Some people may choose high-pressure, high-paying jobs so that they can earn and spend considerable amounts of money on themselves. Others may allocate large portions of their earnings to charity or spend it on their friends and family. Others may devote themselves to a career that can require much time, energy, and expertise but does not offer high financial rewards, like being an elementary school teacher or a social worker. Still others may choose a job that does consume much of their time or provide a high level of income, but still leaves time for family, friends, and contemplation. Some people may prefer to work for a large company; others might want to start their own business. People's freedom to make their own economic choices has a moral value worth respecting.

Clear It Up

Is a diagram by any other name the same?

When you study economics, you may feel buried under an avalanche of diagrams. Your goal should be to recognize the common underlying logic and pattern of the diagrams, not to memorize each one.

This chapter uses only one basic diagram, although we present it with different sets of labels. The consumption budget constraint and the production possibilities frontier for society, as a whole, are the same basic diagram. Figure 2.6 shows an individual budget constraint and a production possibilities frontier for two goods, Good 1 and Good 2. The tradeoff diagram always illustrates three basic themes: scarcity, tradeoffs, and economic efficiency.

The first theme is scarcity. It is not feasible to have unlimited amounts of both goods. Even if the budget constraint or a PPF shifts, scarcity remains—just at a different level. The second theme is tradeoffs. As depicted in the budget constraint or the production possibilities frontier, it is necessary to forgo some of one good to gain more of the other good. The details of this tradeoff vary. In a budget constraint we determine, the tradeoff is determined by the relative prices of the goods: that is, the relative price of two goods in the consumption choice budget constraint. These tradeoffs appear as a straight line. However, a curved line represents the tradeoffs in many production possibilities frontiers because the law of diminishing returns holds that as we add resources to an area, the marginal gains tend to diminish. Regardless of the specific shape, tradeoffs remain.

The third theme is economic efficiency, or getting the most benefit from scarce resources. All choices on the production possibilities frontier show productive efficiency because in such cases, there is no way to increase the quantity of one good without decreasing the quantity of the other. Similarly, when an individual makes a choice along a budget constraint, there is no way to increase the quantity of one good without decreasing the quantity of the other. The choice on a production possibilities set that is socially preferred, or the choice on an individual's budget constraint that is personally preferred, will display allocative efficiency.

The basic budget constraint/production possibilities frontier diagram will recur throughout this book. Some examples include using these tradeoff diagrams to analyze trade, environmental protection and economic output, equality of incomes and economic output, and the macroeconomic tradeoff between consumption and investment. Do not allow the different labels to confuse you. The budget constraint/production possibilities frontier diagram is always just a tool for thinking carefully about scarcity, tradeoffs, and efficiency in a particular situation.

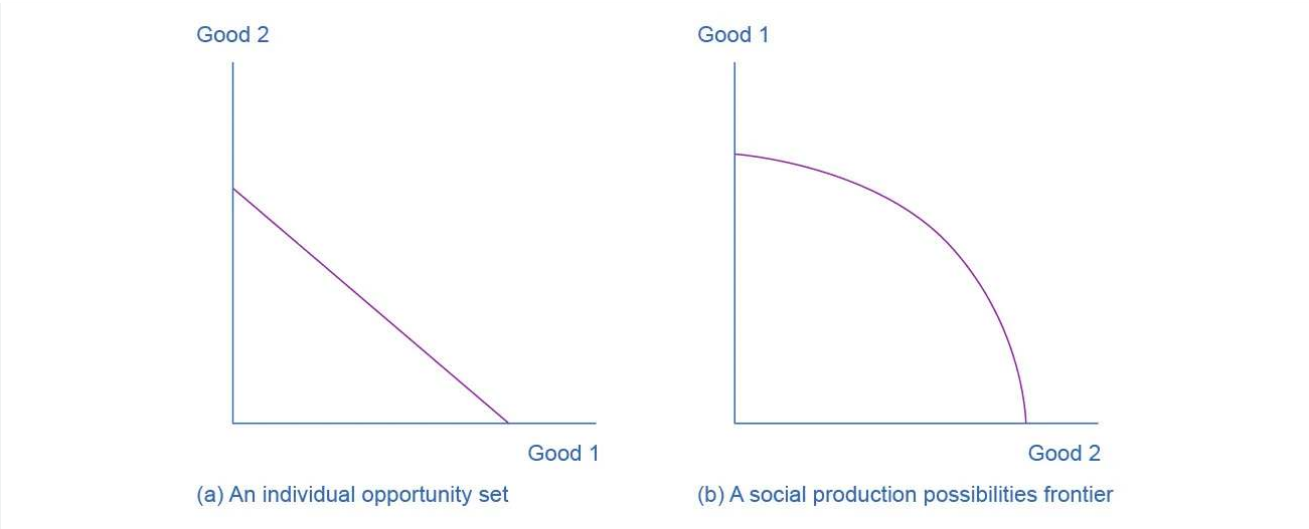


Figure 2.6 The Tradeoff Diagram Both the individual opportunity set (or budget constraint) and the social production possibilities frontier show the constraints under which individual consumers and society as a whole operate. Both diagrams show the tradeoff in choosing more of one good at the cost of less of the other.

Third, self-interested behavior can lead to positive social results. For example, when people work hard to make a living, they create economic output. Consumers who are looking for the best deals will encourage businesses to offer goods and services that meet their needs. Adam Smith, writing in *The Wealth of Nations*, named this property the invisible hand. In describing how consumers and producers interact in a market economy, Smith wrote:

> *Every individual…generally, indeed, neither intends to promote the public interest, nor knows how much he is promoting it. By preferring the support of domestic to that of foreign industry, he intends only his own security; and by directing that industry in such a manner as its produce may be of the greatest value, he intends only his own gain. And he is in this, as in many other cases, led by an invisible hand to promote an end which was no part of his intention…By pursuing his own interest he frequently promotes that of the society more effectually than when he really intends to promote it.*

The metaphor of the invisible hand suggests the remarkable possibility that broader social good can emerge from selfish individual actions.

Fourth, even people who focus on their own self-interest in the economic part of their life often set aside their own narrow self-interest in other parts of life. For example, you might focus on your own self-interest when asking your employer for a raise or negotiating to buy a car. Then you might turn around and focus on other people when you volunteer to read stories at the local library, help a friend move to a new apartment, or donate money to a charity. Self-interest is a reasonable starting point for analyzing many economic decisions, without needing to imply that people never do anything that is not in their own immediate self-interest.

Bring It Home

Choices ... to What Degree?

What have we learned? We know that scarcity impacts all the choices we make. An economist might argue that people do not obtain a bachelor's or master's degree because they do not have the resources to make those choices or because their incomes are too low and/or the price of these degrees is too high. A bachelor's or a master's degree may not be available in their opportunity set.

The price of these degrees may be too high not only because the actual price, college tuition (and perhaps room and board), is too high. An economist might also say that for many people, the full opportunity cost of a bachelor's or a master's degree is too

high. For these people, they are unwilling or unable to make the tradeoff of forfeiting years of working, and earning an income, to earn a degree.

Finally, the statistics we introduced at the start of the chapter reveal information about intertemporal choices. An economist might say that people choose not to obtain a college degree because they may have to borrow money to attend college, and the interest they have to pay on that loan in the future will affect their decisions today. Also, it could be that some people have a preference for current consumption over future consumption, so they choose to work now at a lower salary and consume now, rather than postponing that consumption until after they graduate college.

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2.5: Key Terms

allocative efficiency
when the mix of goods produced represents the mix that society most desires

budget constraint
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

comparative advantage
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

invisible hand
Adam Smith's concept that individuals' self-interested behavior can lead to positive social outcomes

law of diminishing marginal utility
as we consume more of a good or service, the utility we get from additional units of the good or service tends to become smaller than what we received from earlier units

law of diminishing returns
as we add additional increments of resources to producing a good or service, the marginal benefit from those additional increments will decline

marginal analysis
examination of decisions on the margin, meaning a little more or a little less from the status quo

normative statement
statement which describes how the world should be

opportunity cost
measures cost by what we give up/forfeit in exchange; opportunity cost measures the value of the forgone alternative

opportunity set
all possible combinations of consumption that someone can afford given the prices of goods and the individual’s income

positive statement
statement which describes the world as it is

production possibilities frontier (PPF)
a diagram that shows the productively efficient combinations of two products that an economy can produce given the resources it has available.

productive efficiency
when it is impossible to produce more of one good (or service) without decreasing the quantity produced of another good (or service)

sunk costs
costs that we make in the past that we cannot recover

utility
satisfaction, usefulness, or value one obtains from consuming goods and services

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2.6: Key Concepts and Summary

2.1 How Individuals Make Choices Based on Their Budget Constraint

Economists see the real world as one of scarcity: that is, a world in which people's desires exceed what is possible. As a result, economic behavior involves tradeoffs in which individuals, firms, and society must forgo something that they desire to obtain things that they desire more. Individuals face the tradeoff of what quantities of goods and services to consume. The budget constraint, which is the frontier of the opportunity set, illustrates the range of available choices. The relative price of the choices determines the slope of the budget constraint. Choices beyond the budget constraint are not affordable.

Opportunity cost measures cost by what we forgo in exchange. Sometimes we can measure opportunity cost in money, but it is often useful to consider time as well, or to measure it in terms of the actual resources that we must forfeit.

Most economic decisions and tradeoffs are not all-or-nothing. Instead, they involve marginal analysis, which means they are about decisions on the margin, involving a little more or a little less. The law of diminishing marginal utility points out that as a person receives more of something—whether it is a specific good or another resource—the additional marginal gains tend to become smaller. Because sunk costs occurred in the past and cannot be recovered, they should be disregarded in making current decisions.

2.2 The Production Possibilities Frontier and Social Choices

A production possibilities frontier defines the set of choices society faces for the combinations of goods and services it can produce given the resources and the technology that are available. The shape of the PPF is typically curved outward, rather than straight. Choices outside the PPF are unattainable and choices inside the PPF are wasteful. Over time, a growing economy will tend to shift the PPF outwards.

The law of diminishing returns holds that as increments of additional resources are devoted to producing something, the marginal increase in output will become increasingly smaller. All choices along a production possibilities frontier display productive efficiency; that is, it is impossible to use society's resources to produce more of one good without decreasing production of the other good. The specific choice along a production possibilities frontier that reflects the mix of goods society prefers is the choice with allocative efficiency. The curvature of the PPF is likely to differ by country, which results in different countries having comparative advantage in different goods. Total production can increase if countries specialize in the goods in which they have comparative advantage and trade some of their production for the remaining goods.

2.3 Confronting Objections to the Economic Approach

The economic way of thinking provides a useful approach to understanding human behavior. Economists make the careful distinction between positive statements, which describe the world as it is, and normative statements, which describe how the world should be. Even when economics analyzes the gains and losses from various events or policies, and thus draws normative conclusions about how the world should be, the analysis of economics is rooted in a positive analysis of how people, firms, and governments actually behave, not how they should behave.

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CHAPTER OVERVIEW

3: Demand and Supply

3.1: Introduction to Demand and Supply

3.2: Demand, Supply, and Equilibrium in Markets for Goods and Services

3.3: Shifts in Demand and Supply for Goods and Services

3.4: Changes in Equilibrium Price and Quantity- The Four-Step Process

3.5: Price Ceilings and Price Floors

3.6: Demand, Supply, and Efficiency

3.7: Key Terms

3.8: Key Concepts and Summary

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3.1: Introduction to Demand and Supply



Figure 3.1 Farmer’s Market Organic vegetables and fruits that are grown and sold within a specific geographical region should, in theory, cost less than conventional produce because the transportation costs are less. That is not, however, usually the case. (Credit: modification of "Old Farmers' Market" by NatalieMaynor/Flickr, CC BY 2.0)

Chapter Objectives

In this chapter, you will learn about:

- Demand, Supply, and Equilibrium in Markets for Goods and Services
- Shifts in Demand and Supply for Goods and Services
- Changes in Equilibrium Price and Quantity: The Four-Step Process
- Price Ceilings and Price Floors

Bring It Home

Why Can We Not Get Enough of Organic Foods?

Organic food is increasingly popular, not just in the United States, but worldwide. At one time, consumers had to go to specialty stores or farmers' markets to find organic produce. Now it is available in most grocery stores. In short, organic has become part of the mainstream.

Ever wonder why organic food costs more than conventional food? Why, say, does an organic Fuji apple cost $2.75 a pound, while its conventional counterpart costs $1.72 a pound? The same price relationship is true for just about every organic product on the market. If many organic foods are locally grown, would they not take less time to get to market and therefore be

cheaper? What are the forces that keep those prices from coming down? Turns out those forces have quite a bit to do with this chapter's topic: demand and supply.

An auction bidder pays thousands of dollars for a dress Whitney Houston wore. A collector spends a small fortune for a few drawings by John Lennon. People usually react to purchases like these in two ways: their jaw drops because they think these are high prices to pay for such goods or they think these are rare, desirable items and the amount paid seems right.

Link It Up

Visit this website to read a list of bizarre items that have been purchased for their ties to celebrities. These examples represent an interesting facet of demand and supply.

When economists talk about prices, they are less interested in making judgments than in gaining a practical understanding of what determines prices and why prices change. Consider a price most of us contend with weekly: that of a gallon of gas. Why was the average price of gasoline in the United States $3.16 per gallon in June of 2020? Why did the price for gasoline fall sharply to $2.42 per gallon by January of 2021? To explain these price movements, economists focus on the determinants of what gasoline buyers are willing to pay and what gasoline sellers are willing to accept.

As it turns out, the price of gasoline in June of any given year is nearly always higher than the price in January of that same year. Over recent decades, gasoline prices in midsummer have averaged about 10 cents per gallon more than their midwinter low. The likely reason is that people drive more in the summer, and are also willing to pay more for gas, but that does not explain how steeply gas prices fell. Other factors were at work during those 18 months, such as increases in supply and decreases in the demand for crude oil.

This chapter introduces the economic model of demand and supply—one of the most powerful models in all of economics. The discussion here begins by examining how demand and supply determine the price and the quantity sold in markets for goods and services, and how changes in demand and supply lead to changes in prices and quantities.

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3.2: Demand, Supply, and Equilibrium in Markets for Goods and Services

Learning Objectives

By the end of this section, you will be able to:

- Explain demand, quantity demanded, and the law of demand
- Explain supply, quantity supplied, and the law of supply
- Identify a demand curve and a supply curve
- Explain equilibrium, equilibrium price, and equilibrium quantity

First let's first focus on what economists mean by demand, what they mean by supply, and then how demand and supply interact in a market.

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 fundamentally based on needs and wants—if you have no need or want for something, you won't buy it. While a consumer may be able to differentiate between a need and a want, from an economist's perspective they are the same thing. Demand is also based on ability to pay. If you cannot pay for it, you have no effective demand. By this definition, a person who does not have a drivers license has no effective demand for a car.

What a buyer pays for a unit of the specific good or service is called price. The total number of units that consumers would purchase at that price is called the quantity demanded. A rise in price of a good or service almost always decreases the quantity demanded of that good or service. Conversely, a fall in price will increase the quantity demanded. When the price of a gallon of gasoline increases, 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 (which we explain in the next module) are held constant.

We can show an example from the market for gasoline in a table or a graph. Economist call a table that shows the quantity demanded at each price, such as Table 3.1, a demand schedule. In this case we measure price in dollars per gallon of gasoline. We measure the quantity demanded 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). A demand curve shows the relationship between price and quantity demanded on a graph like Figure 3.2, with quantity on the horizontal axis and the price per gallon on the vertical 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 axis. Economics is not math.)

Table 3.1 shows the demand schedule and the graph in Figure 3.2 shows the demand curve. These are two ways to describe the same relationship between price and quantity demanded.

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

Table 3.1 Price and Quantity Demanded of Gasoline

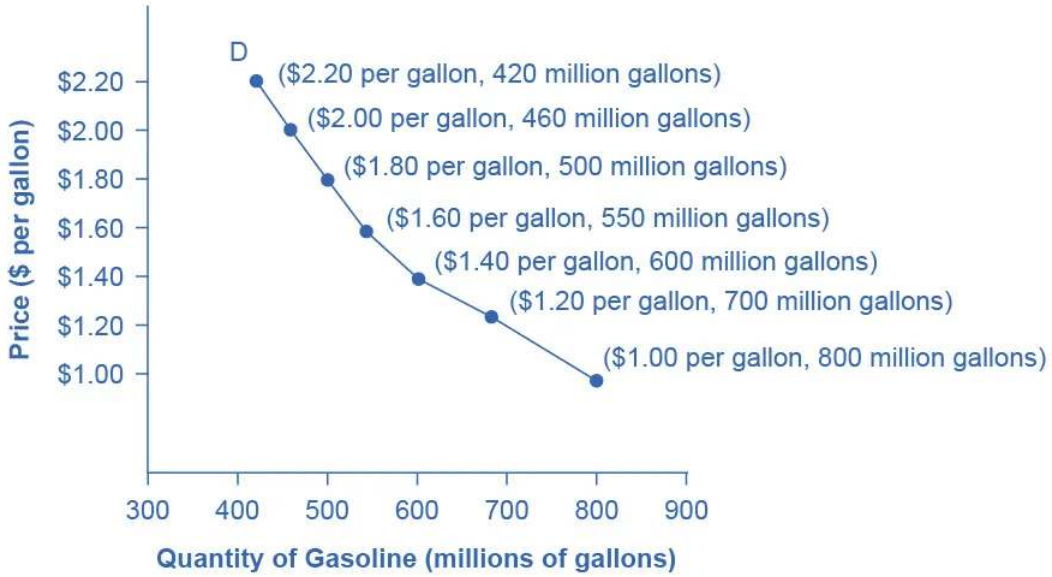


Figure 3.2 A Demand Curve for Gasoline The demand schedule shows that as price rises, quantity demanded decreases, and vice versa. We graph these points, and the line connecting them is the demand curve (D). The downward slope of the demand curve again illustrates the law of demand—the inverse relationship between prices and quantity demanded.

Demand curves will appear 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. 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.

Confused about these different types of demand? Read the next Clear It Up feature.

Clear It Up

Is demand the same as 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 a (specific) point on the curve.

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 for refining 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 assumes that all other variables that affect supply (to be explained in the next module) are held constant.

Still unsure about the different types of supply? See the following Clear It Up feature.

Clear It Up

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 we can illustrate 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 a (specific) point on the curve.

Figure 3.3 illustrates the law of supply, again using the market for gasoline as an example. Like demand, we can illustrate supply using a table or a graph. A supply schedule is a table, like Table 3.2, that shows the quantity supplied at a range of different prices. Again, we measure price in dollars per gallon of gasoline and we measure quantity supplied in millions of gallons. A supply curve is a graphic illustration of the relationship between price, shown on the vertical axis, and quantity, shown on the horizontal axis. The supply schedule and the supply curve are just two different ways of showing the same information. Notice that the horizontal and vertical axes on the graph for the supply curve are the same as for the demand curve.

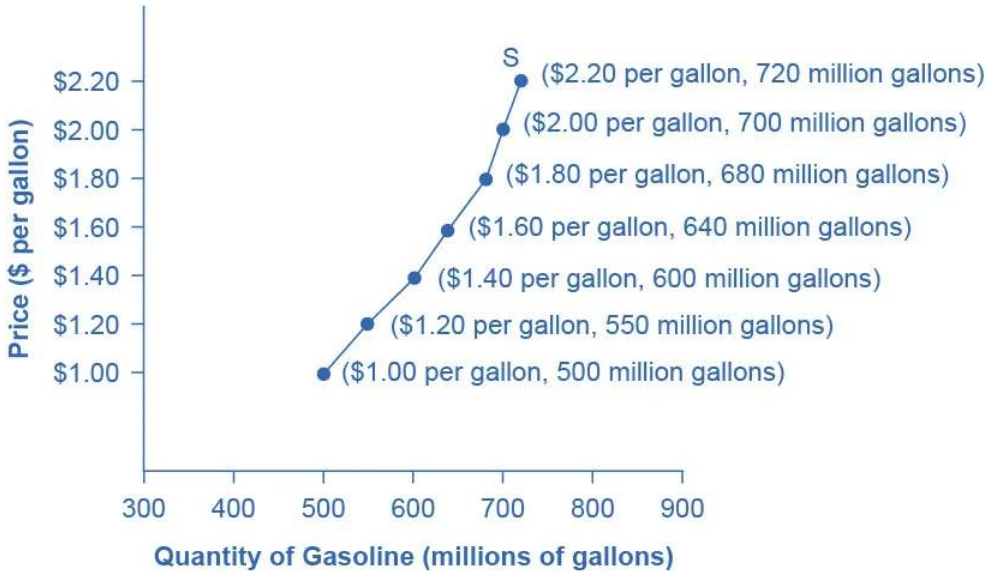


Figure 3.3 A Supply Curve for Gasoline The supply schedule is the table that shows quantity supplied of gasoline at each price. As price rises, quantity supplied also increases, and vice versa. The supply curve (S) is created by graphing the points from the supply schedule and then connecting them. The upward slope of the supply curve illustrates the law of supply—that a higher price leads to a higher quantity supplied, and vice versa.

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

Table 3.2 Price and Supply of 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.

Equilibrium—Where Demand and Supply Intersect

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.

Figure 3.4 illustrates the interaction of demand and supply in the market for gasoline. The demand curve (D) is identical to Figure 3.2. The supply curve (S) is identical to Figure 3.3. Table 3.3 contains the same information in tabular form.

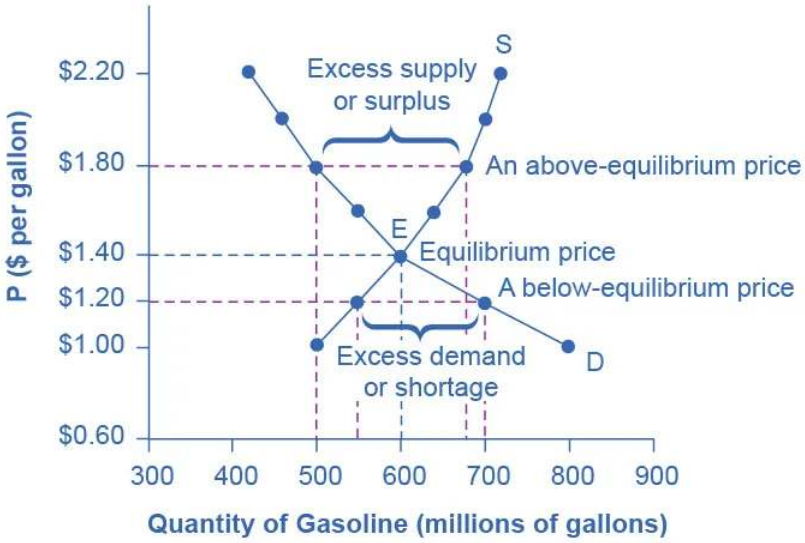


Figure 3.4 Demand and Supply for Gasoline The demand curve (D) and the supply curve (S) intersect at the equilibrium point E, with a price of $1.40 and a quantity of 600. The equilibrium price is the only price where quantity demanded is equal to quantity supplied. At a price above equilibrium like $1.80, quantity supplied exceeds the quantity demanded, so there is excess supply. At a price below equilibrium such as $1.20, quantity demanded exceeds quantity supplied, so there is excess demand.

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

Table 3.3 Price, Quantity Demanded, and Quantity Supplied

Remember this: When two lines on a diagram cross, this intersection usually means something. The point where the supply curve (S) and the demand curve (D) cross, designated by point E in Figure 3.4, is called the equilibrium. The equilibrium price is the only price where the plans of consumers and the plans of producers agree—that is, where the amount of the product consumers want to buy (quantity demanded) is equal to the amount producers want to sell (quantity supplied). Economists call this common quantity 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.

In Figure 3.4, the equilibrium price is $1.40 per gallon of gasoline and the equilibrium quantity is 600 million gallons. If you had only the demand and supply schedules, and not the graph, you could find the equilibrium by looking for the price level on the tables where the quantity demanded and the quantity supplied are equal.

The word “equilibrium” means “balance.” If a market is at its equilibrium price and quantity, then it has no reason to move away from that point. However, if a market is not at equilibrium, then economic pressures arise to move the market toward the equilibrium price and the equilibrium quantity.

Imagine, for example, that the price of a gallon of gasoline was above the equilibrium price—that is, instead of $1.40 per gallon, the price is $1.80 per gallon. The dashed horizontal line at the price of $1.80 in Figure 3.4 illustrates this above-equilibrium price. At this higher price, the quantity demanded drops from 600 to 500. This decline in quantity reflects how consumers react to the higher price by finding ways to use less gasoline.

Moreover, at this higher price of $1.80, the quantity of gasoline supplied rises from 600 to 680, as the higher price makes it more profitable for gasoline producers to expand their output. Now, consider how quantity demanded and quantity supplied are related at this above-equilibrium price. Quantity demanded has fallen to 500 gallons, while quantity supplied has risen to 680 gallons. In fact, at any above-equilibrium price, the quantity supplied exceeds the quantity demanded. We call this an excess supply or a surplus.

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 to cover their expenses. In this situation, some producers and sellers 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 in turn will stimulate a higher quantity demanded. Therefore, if the price is above the equilibrium level, incentives built into the structure of demand and supply will create pressures for the price to fall toward the equilibrium.

Now suppose that the price is below its equilibrium level at $1.20 per gallon, as the dashed horizontal line at this price in Figure 3.4 shows. At this lower price, the quantity demanded increases from 600 to 700 as drivers take longer trips, spend more minutes warming up the car in the driveway in wintertime, stop sharing rides to work, and buy larger cars that get fewer miles to the gallon. However, the below-equilibrium price reduces gasoline producers’ incentives to produce and sell gasoline, and the quantity supplied falls from 600 to 550.

When the price is below equilibrium, there is excess demand, or a shortage—that is, at the given price the quantity demanded, which has been stimulated by the lower price, now exceeds the quantity supplied, which has been depressed by the lower price. 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. As a result, the price rises toward the equilibrium level. Read Demand, Supply, and Efficiency for more discussion on the importance of the demand and supply model.

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3.3: Shifts in Demand and Supply for Goods and Services

Learning Objectives

By the end of this section, you will be able to:

- Identify factors that affect demand
- Graph demand curves and demand shifts
- Identify factors that affect supply
- Graph supply curves and supply shifts

The previous module explored how price affects the quantity demanded and the quantity supplied. The result was the demand curve and the supply curve. Price, however, is not the only factor that influences buyers' and sellers' decisions. For example, how is demand for vegetarian food affected if, say, health concerns cause more consumers to avoid eating meat? How is the supply of diamonds affected if diamond producers discover several new diamond mines? What are the major factors, in addition to the price, that influence demand or supply?

Link It Up

Visit this website to read a brief note on how marketing strategies can influence supply and demand of products.

What Factors Affect Demand?

We defined demand as the amount of some product a consumer is willing and able to purchase at each price. That suggests at least two factors that affect demand. Willingness to purchase suggests a desire, based on what economists call tastes and preferences. If you neither need nor want something, you will not buy it, and if you really like something, you will buy more of it than someone who does not share your strong preference for 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. Prices of related goods can affect demand also. If you need a new car, 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 for both individual and market demand 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 is a relationship between two, and only two, variables: quantity on the horizontal axis and price on the vertical 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. A demand curve or a supply curve is a relationship between two, and only two, variables when all other variables are kept constant. If all else is not held equal, then the laws of supply and demand will not necessarily hold, as the following Clear It Up feature shows.

Clear It Up

When does *ceteris paribus* apply?

We typically apply *ceteris paribus* when we observe how changes in price affect demand or supply, but we can apply *ceteris paribus* 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, assuming 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.

How Does Income Affect Demand?

Let's use income as an example of how factors other than price affect demand. Figure 3.5 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.

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 3.5. 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 3.4 shows clearly that this increased demand would occur at every price, not just the original one.

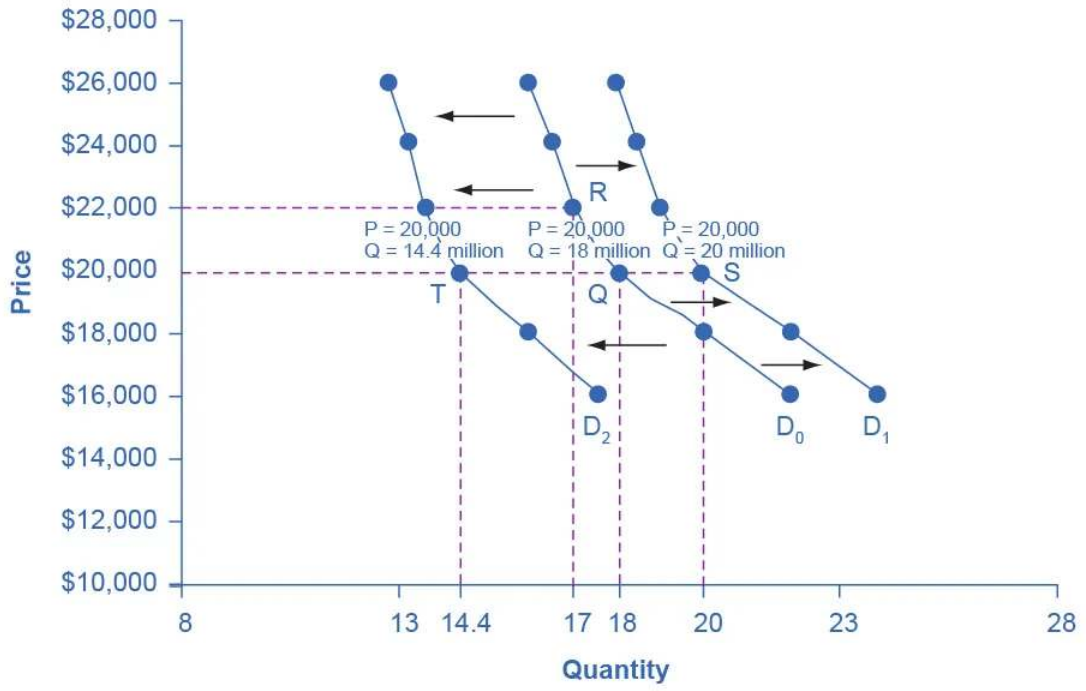


Figure 3.5 Shifts in Demand: A Car Example Increased demand means that at every given price, the quantity demanded is higher, so that the demand curve shifts to the right from D_0 to D_1. Decreased demand means that at every given price, the quantity demanded is lower, so that the demand curve shifts to the left from D_0 to D_2.

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

Table 3.4 Price and Demand Shifts: A Car Example

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.

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.

In the previous section, we 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. 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. 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.

Other Factors That Shift Demand Curves

Income is not the only factor that causes a shift in demand. Other factors 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

From 1980 to 2021, the per-person consumption of chicken by Americans rose from 47 pounds per year to 97 pounds per year, and consumption of beef fell from 76 pounds per year to 59 pounds per year, according to the U.S. Department of Agriculture (USDA). Changes like these are largely due to movements 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% in 1970 to 12.6% in 2000, and will be a projected (by the U.S. Census Bureau) 20% 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

Changes in the prices of related goods such as substitutes or complements also can affect the demand for a product. A substitute is a good or service that we can use in place of another good or service. As electronic books, like this one, 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 we can show graphically as a leftward shift in the demand curve for laptops. A higher price for a substitute good has the reverse effect.

Other goods are complements for each other, meaning we often use the goods 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 demanded of golf clubs 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 or Other Factors that Affect Demand

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. We show these changes in demand as shifts in the curve. Therefore, a shift in demand happens when a change in some economic factor (other than price) causes a different quantity to be demanded at every price. The following Work It Out feature shows how this happens.

Work It Out

Shift in Demand

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 an example 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. See an example in Figure 3.6.

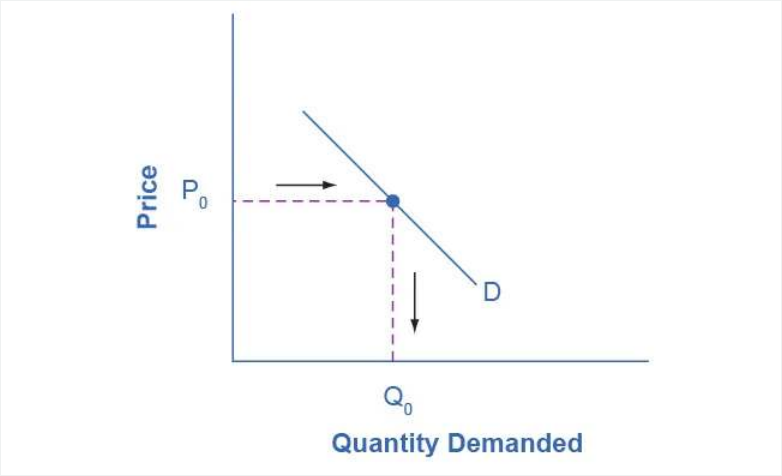


Figure 3.6 Demand Curve We can use the demand curve to identify how much consumers would buy at any given price.

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. Figure 3.7 provides an example.

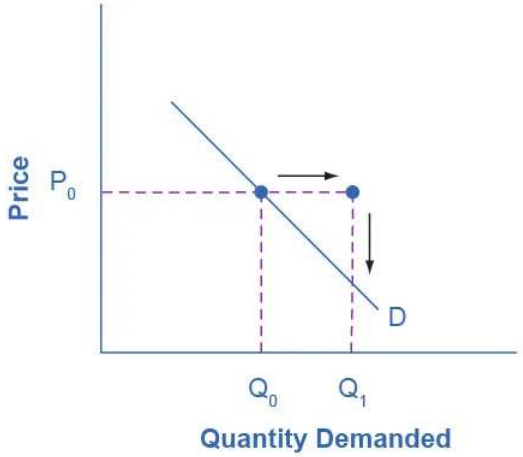


Figure 3.7 Demand Curve with Income Increase With an increase in income, consumers will purchase larger quantities, pushing demand to the right.

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 Figure 3.8 illustrates.

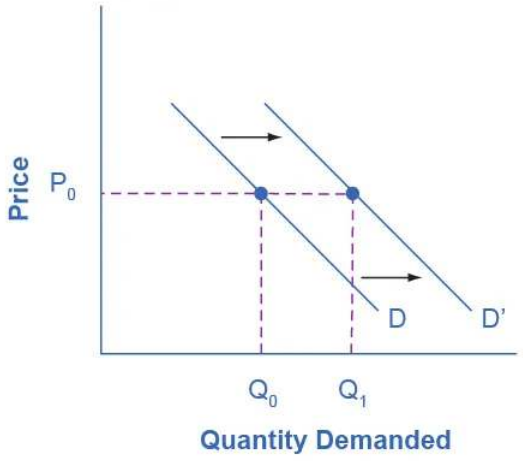


Figure 3.8 Demand Curve Shifted Right With an increase in income, consumers will purchase larger quantities, pushing demand to the right, and causing the demand curve to shift right.

Summing Up Factors That Change Demand

Figure 3.9 summarizes six factors that can shift demand curves. 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.

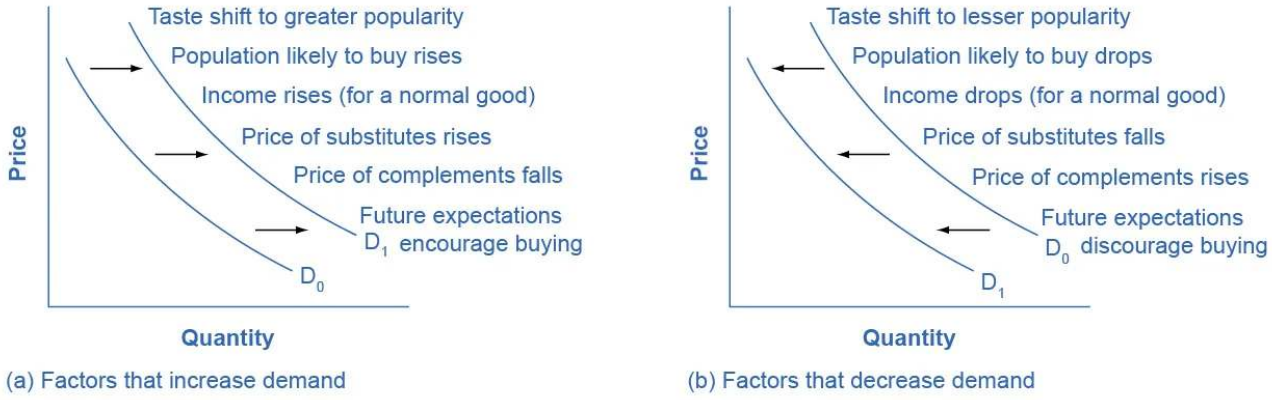


Figure 3.9 Factors That Shift Demand Curves (a) A list of factors that can cause an increase in demand from D_0 to D_1. (b) The same factors, if their direction is reversed, can cause a decrease in demand from D_0 to D_1.

When a demand curve shifts, it will then intersect with a given supply curve at a different equilibrium price and quantity. We are, however, getting ahead of our story. Before discussing how changes in demand can affect equilibrium price and quantity, we first need to discuss shifts in supply curves.

How Production Costs Affect Supply

A supply curve shows how quantity supplied will change as the price rises and falls, assuming *ceteris paribus* so that no other economically relevant factors are changing. If other factors relevant to supply do change, then the entire supply curve will shift. Just as we described a shift in demand as 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. A firm produces goods and services using combinations of labor, materials, and machinery, or what we call inputs or 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 is more motivated to produce output, since the more it produces the more profit it will earn. When costs of production fall, a firm will tend to supply a larger quantity at any given price for its output. We can show this by the supply curve shifting to the right.

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 messages 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 3.10. 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. We can show the same information in table form, as in Table 3.5.

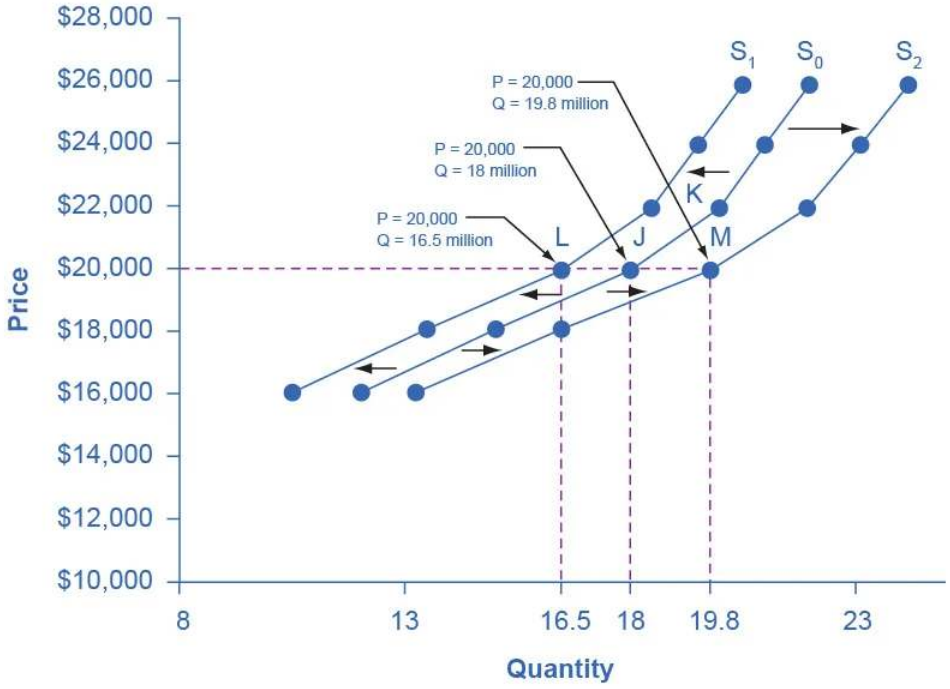


Figure 3.10 Shifts in Supply: A Car Example Decreased supply means that at every given price, the quantity supplied is lower, so that the supply curve shifts to the left, from S_0 to S_1. Increased supply means that at every given price, the quantity supplied is higher, so that the supply curve shifts to the right, from S_0 to S_2.

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
$26,000	20.5 million	22.0 million	24.2 million

Table 3.5 Price and Shifts in Supply: A Car Example

Now, imagine that the price of steel, an important ingredient in manufacturing cars, 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. We can show this 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.

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.

Changes in weather and climate will affect the cost of production for many agricultural products. For example, in 2014 the Manchurian Plain in Northeastern China, which produces most of the country's wheat, corn, and soybeans, experienced its most severe drought in 50 years. 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 the firm 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 used 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. Businesses treat taxes as costs. Higher costs decrease supply for the reasons we 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 costs.

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, taxes or regulations are an additional cost of production that shifts supply to the left, leading the firm to produce a lower quantity at every given price. Government subsidies reduce the cost of production and increase supply at every given price, shifting supply to the right. The following Work It Out feature shows how this shift happens.

Work It Out

Shift in Supply

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 a production cost increase. (We'll introduce some other concepts regarding firm decision-making in Chapters 7 and 8.)

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. Figure 3.11 provides an example.

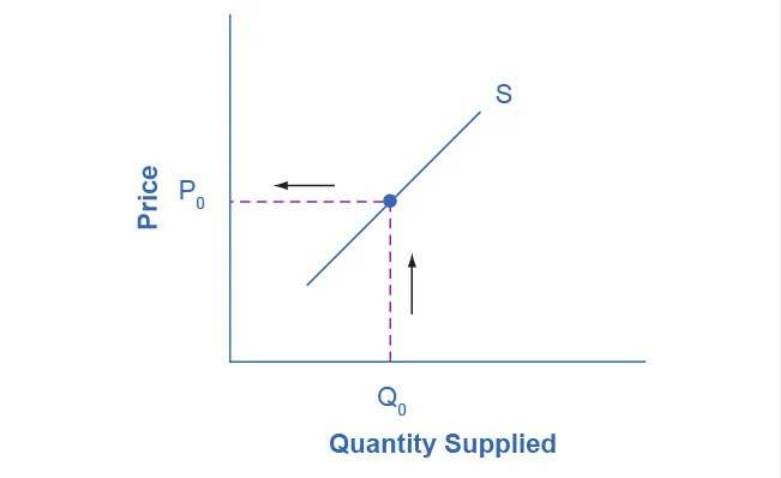


Figure 3.11 Supply Curve You can use a supply curve to show the minimum price a firm will accept to produce a given quantity of output.

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 cost of producing pizzas at the margin; in this case, the cost of producing the pizza, including cost of ingredients (e.g., dough, sauce, cheese, and pepperoni), the cost of the pizza oven, the shop rent, and the workers' wages. The second part is the firm's desired profit, which is determined, among other factors, by the profit margins in that particular business. (Desired profit is not necessarily the same as economic profit, which will be explained in Chapter 7.) If you add these two parts together, you get the price the firm wishes to charge. The quantity Q0 and associated price P0 give you one point on the firm's supply curve, as Figure 3.12 illustrates.

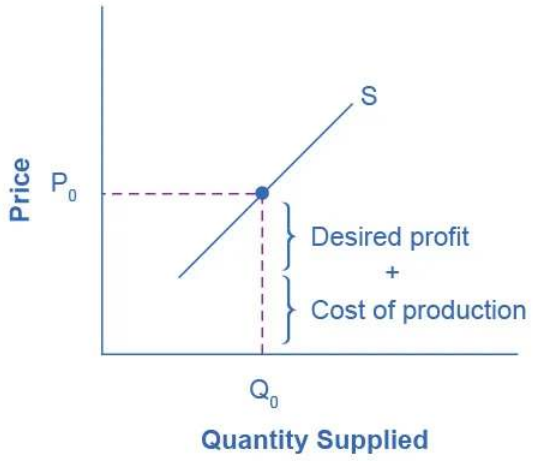


Figure 3.12 Setting Prices The cost of production and the desired profit equal the price a firm will set for a product.

Step 3. Now, suppose that the cost of production increases. 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 Figure 3.13 shows.

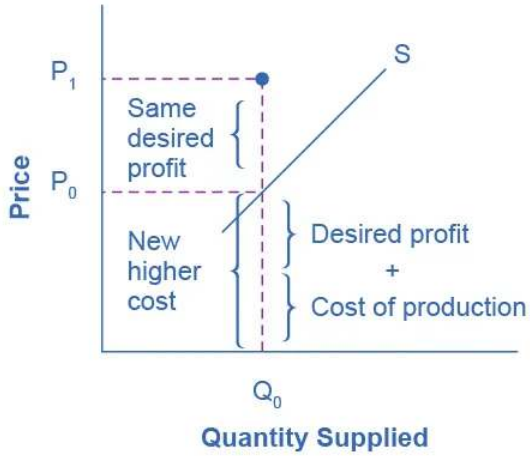


Figure 3.13 Increasing Costs Leads to Increasing Price Because the cost of production and the desired profit equal the price a firm will set for a product, if the cost of production increases, the price for the product will also need to increase.

Step 4. Shift the supply curve through this point. You will see that an increase in cost causes an upward (or a leftward) shift of the supply curve so that at any price, the quantities supplied will be smaller, as Figure 3.14 illustrates.

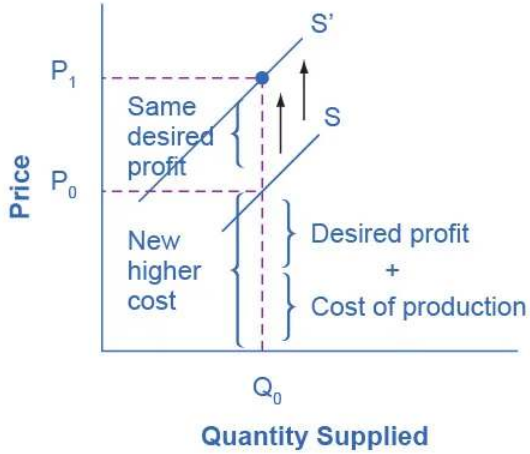


Figure 3.14 Supply Curve Shifts When the cost of production increases, the supply curve shifts upwardly to a new price level.

Summing Up Factors That Change Supply

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

Figure 3.15 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.

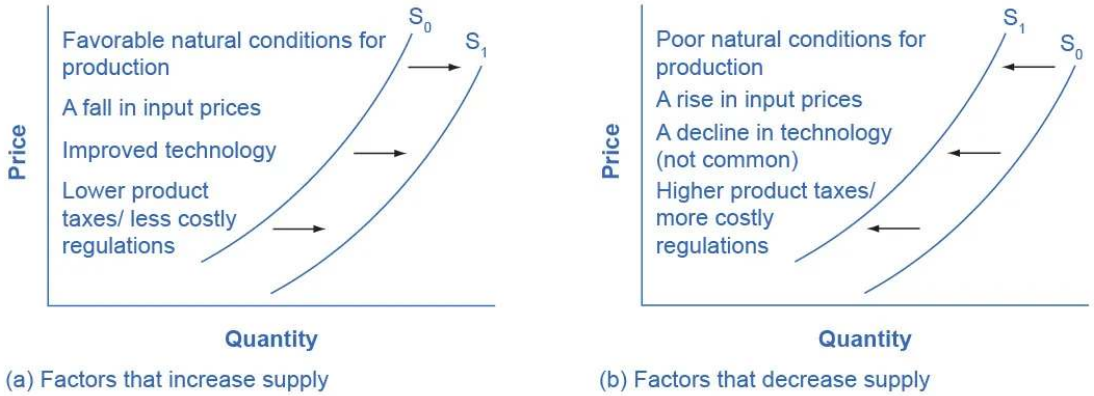


Figure 3.15 Factors That Shift Supply Curves (a) A list of factors that can cause an increase in supply from S_0 to S_1. (b) The same factors, if their direction is reversed, can cause a decrease in supply from S_0 to S_1.

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. We include factors other than price that affect demand and supply 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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3.4: Changes in Equilibrium Price and Quantity- The Four-Step Process

Learning Objectives

By the end of this section, you will be able to:

- Identify equilibrium price and quantity through the four-step process
- Graph equilibrium price and quantity
- Contrast shifts of demand or supply and movements along a demand or supply curve
- Graph demand and supply curves, including equilibrium price and quantity, based on real-world examples

Let's begin this discussion with a single economic event. It might be an event that affects demand, like a change in income, population, tastes, prices of substitutes or complements, or expectations about future prices. It might be an event that affects supply, like a change in natural conditions, input prices, or technology, or government policies that affect production. How does this economic event affect equilibrium price and quantity? We will analyze this question using a four-step process.

Step 1. Draw a demand and supply model before the economic change took place. To establish the model requires four standard pieces of information: The law of demand, which tells us the slope of the demand curve is negative; the law of supply, which tells us that the slope of the supply curve is positive; the shift variables for demand; and the shift variables for supply. From this model, find the initial equilibrium values for price and quantity.

Step 2. Decide whether the economic change you are analyzing affects demand or supply. In other words, does the event refer to something in the list of demand factors or supply factors?

Step 3. Decide 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 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.

Good Weather for Salmon Fishing

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? Figure 3.16 illustrates the four-step approach, which we explain below, to work through this problem. Table 3.6 also provides the information to work the problem.

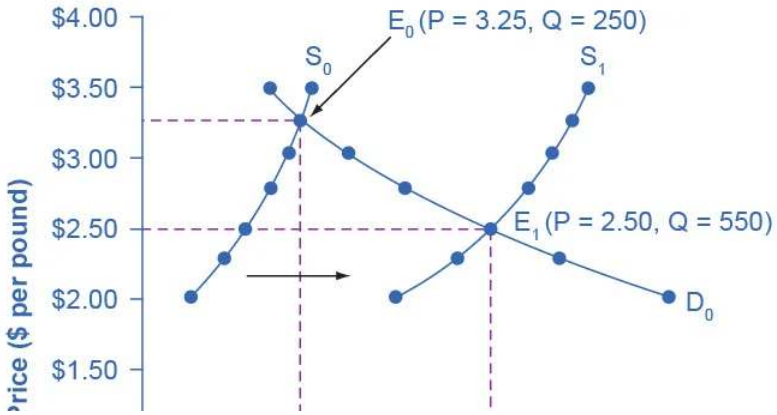
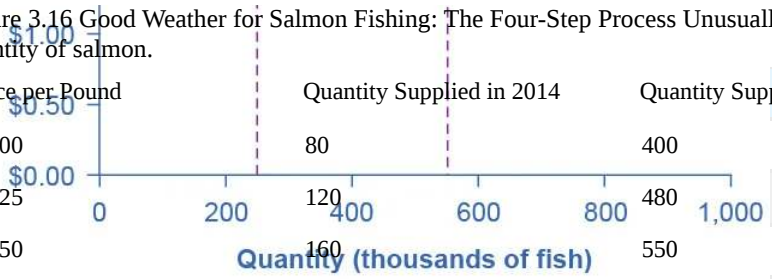


Figure 3.16 Good Weather for Salmon Fishing: The Four-Step Process Unusually good weather leads to changes in the price and quantity of salmon.



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

Table 3.6 Salmon Fishing

Step 1. Draw a demand and supply model to illustrate the market for salmon in the year before the good weather conditions began. The demand curve D_0 and the supply curve S_0 show that the original equilibrium price is $3.25 per pound and the original equilibrium quantity is 250,000 fish. (This price per pound is what commercial buyers pay at the fishing docks. What consumers pay at the grocery is higher.)

Step 2. Did the economic event affect supply or demand? Good weather is an example of a natural condition that affects supply.

Step 3. Was the effect on supply an increase or a decrease? Good weather is a change in natural conditions that increases the quantity supplied at any given price. The supply curve shifts to the right, moving from the original supply curve S_0 to the new supply curve S_1, which Figure 3.16 and Table 3.6 show.

Step 4. Compare the new equilibrium price and quantity to the original equilibrium. At the new equilibrium E_1, the equilibrium price falls from $3.25 to $2.50, but the equilibrium quantity increases from 250,000 to 550,000 salmon. Notice that the equilibrium quantity demanded increased, even though the demand curve did not move.

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.

Newspapers and the Internet

According to the Pew Research Center for People and the Press, increasingly more people, especially younger people, are obtaining 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 access the news. From 2004 to 2012, the share of Americans who reported obtaining their news from digital sources increased from 24% to 39%. How has this affected consumption of print news media, and radio and television news? Figure 3.17 and the text below illustrates using the four-step analysis to answer this question.

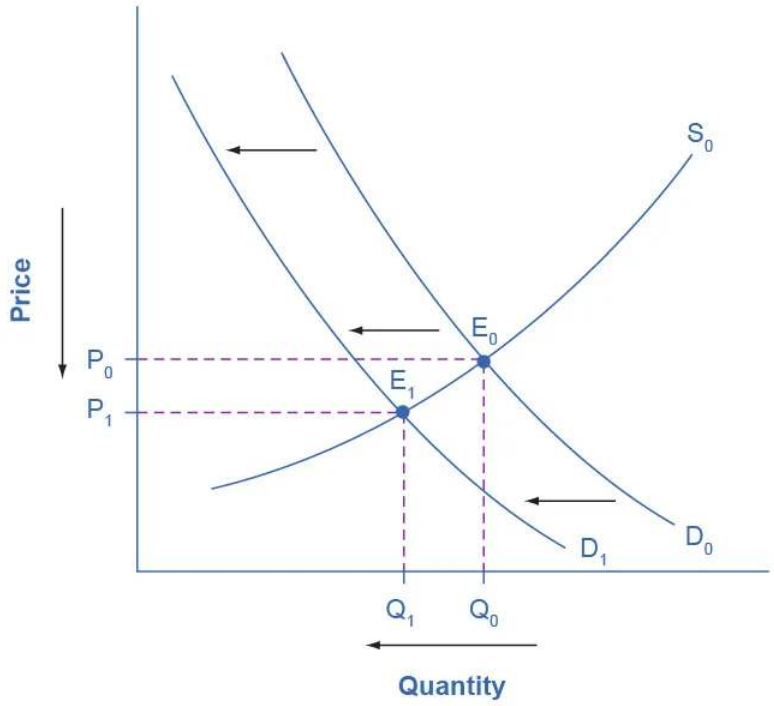


Figure 3.17 The Print News Market: A Four-Step Analysis A change in tastes from print news sources to digital sources results in a leftward shift in demand for the former. The result is a decrease in both equilibrium price and quantity.

Step 1. Develop 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, we perform the analysis without specific numbers on the price and quantity axis.

Step 2. Did the described change affect supply or demand? A change in tastes, from traditional news sources (print, radio, and television) to digital sources, caused a change in demand for the former.

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

Step 4. Compare the new equilibrium price and quantity to the original equilibrium price. The new equilibrium (E_1) occurs at a lower quantity and a lower price than the original equilibrium (E_0).

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% of Americans indicated they received their news from print sources, while only 29% did so in 2012. Radio news has followed a similar path in recent decades, with the share of Americans obtaining their news from radio declining from 54% in 1991 to 33% in 2012. Television news has held its own in recent years, with a market share staying in the mid to upper fifties. What does this suggest for the future, given that two-thirds of Americans under 30 years old say they do not obtain their news from television at all?

The Interconnections and Speed of Adjustment in Real Markets

In the real world, many factors that affect demand and supply can change all at once. For example, the demand for cars might increase because of rising incomes and population, and it might decrease because of rising gasoline prices (a complementary good). Likewise, the supply of cars might increase because of innovative new technologies that reduce the cost of car production, and it might decrease as a result of new government regulations requiring the installation of costly pollution-control technology.

Moreover, rising incomes and population or changes in gasoline prices will affect many markets, not just cars. How can an economist sort out all these interconnected events? The answer lies in the *ceteris paribus* assumption. Look at how each economic event affects each market, one event at a time, holding all else constant. Then combine the analyses to see the net effect.

A Combined Example

The U.S. Postal Service is facing difficult challenges. Compensation for postal workers tends to increase most years due to cost-of-living increases. At the same time, increasingly more people are using email, text, and other digital message forms such as Facebook and Twitter to communicate with friends and others. What does this suggest about the continued viability of the Postal Service? Figure 3.18 and the text below illustrate this using the four-step analysis to answer this question.

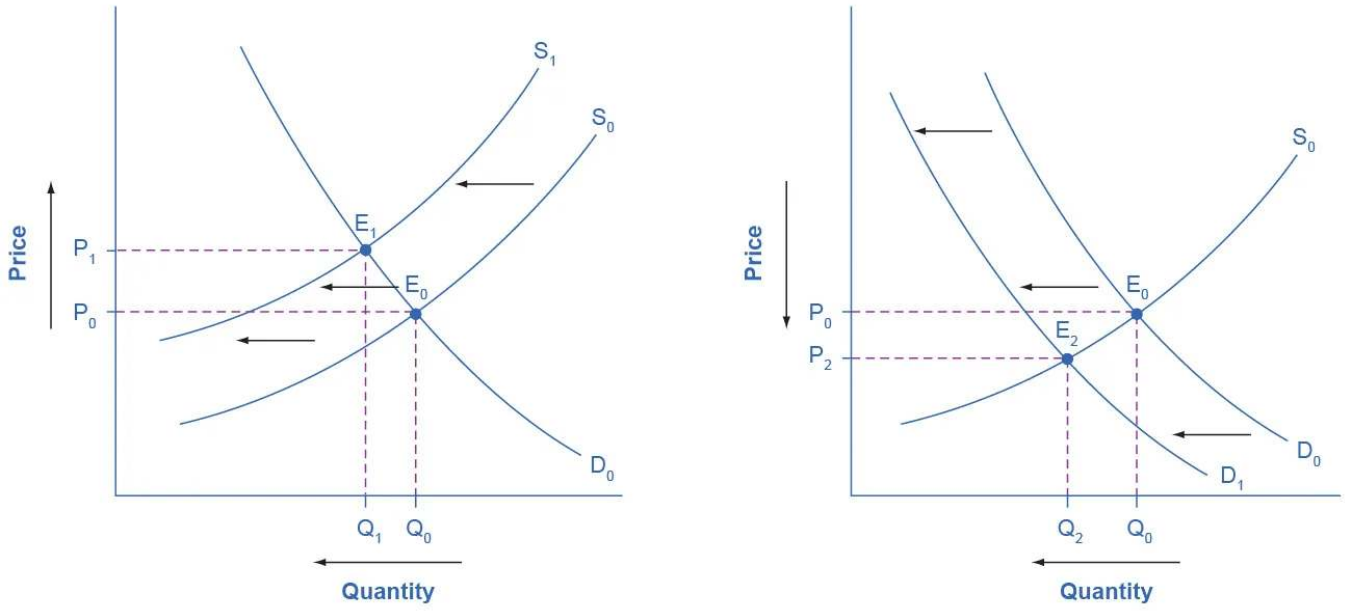


Figure 3.18 Higher Compensation for Postal Workers: A Four-Step Analysis (a) Higher labor compensation causes a leftward shift in the supply curve, a decrease in the equilibrium quantity, and an increase in the equilibrium price. (b) A change in tastes away from Postal Services causes a leftward shift in the demand curve, a decrease in the equilibrium quantity, and a decrease in the equilibrium price.

Since this problem involves two disturbances, we need two four-step analyses, the first to analyze the effects of higher compensation for postal workers, the second to analyze the effects of many people switching from “snail mail” to email and other digital messages.

Figure 3.18 (a) shows the shift in supply discussed in the following steps.

Step 1. Draw a demand and supply model to illustrate what the market for the U.S. Postal Service looked like before this scenario starts. The demand curve D_0 and the supply curve S_0 show the original relationships.

Step 2. Did the described change affect supply or demand? Labor compensation is a cost of production. A change in production costs caused a change in supply for the Postal Service.

Step 3. Was the effect on supply positive or negative? 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_0 to S_1.

Step 4. Compare the new equilibrium price and quantity to the original equilibrium price. The new equilibrium (E_1) occurs at a lower quantity and a higher price than the original equilibrium (E_0).

Figure 3.18 (b) shows the shift in demand in the following steps.

Step 1. Draw a demand and supply model to illustrate what the market for U.S. Postal Services looked like before this scenario starts. The demand curve D_0 and the supply curve S_0 show the original relationships. Note that this diagram is independent from the diagram in panel (a).

Step 2. Did the change described affect supply or demand? A change in tastes away from snail mail toward digital messages will cause a change in demand for the Postal Service.

Step 3. Was the effect on demand positive or negative? A change in tastes away from snailmail 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_0 to D_1.

Step 4. Compare the new equilibrium price and quantity to the original equilibrium price. The new equilibrium (E_2) occurs at a lower quantity and a lower price than the original equilibrium (E_0).

The final step in a scenario where both supply and demand shift is to combine the two individual analyses to determine what happens to the equilibrium quantity and price. Graphically, we superimpose the previous two diagrams one on top of the other, as in Figure 3.19.

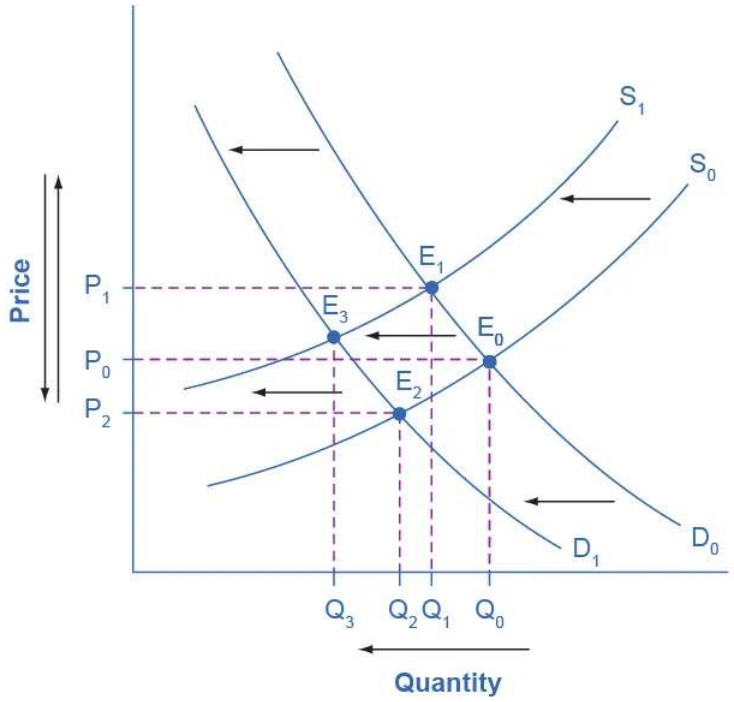


Figure 3.19 Combined Effect of Decreased Demand and Decreased Supply Supply and demand shifts cause changes in equilibrium price and quantity.

Following are the results:

Effect on Quantity: The effect of higher labor compensation on Postal Services because it raises the cost of production is to decrease the equilibrium quantity. The effect of a change in tastes away from snail mail is to decrease the equilibrium quantity. Since both shifts are to the left, the overall impact is a decrease in the equilibrium quantity of Postal Services (Q_3). This is easy to see graphically, since Q_3 is to the left of Q_0.

Effect on Price: The overall effect on price is more complicated. The effect of higher labor compensation on Postal Services, because it raises the cost of production, is to increase the equilibrium price. The effect of a change in tastes away from snail mail is to decrease the equilibrium price. Since the two effects are in opposite directions, unless we know the magnitudes of the two effects, the overall effect is unclear. 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. In other cases, it might be the opposite.

The next Clear It Up feature focuses on the difference between shifts of supply or demand and movements along a curve.

Clear It Up

What is the difference between shifts of demand or supply versus movements along a demand or supply curve?

One common mistake in applying the demand and supply framework is to confuse the shift of a demand or a supply curve with movement along a demand or supply curve. As an example, consider a problem that asks whether a drought will increase or decrease the equilibrium quantity and equilibrium price of wheat. Lee, a student in an introductory economics class, might reason:

"Well, it is clear that a drought reduces supply, so I will shift back the supply curve, as in the shift from the original supply curve S_0 to S_1 on the diagram (Shift 1). The equilibrium moves from E_0 to E_1, the equilibrium quantity is lower and the equilibrium price is higher. Then, a higher price makes farmers more likely to supply the good, so the supply curve shifts right, as shows the shift from S_1 to S_2, shows on the diagram (Shift 2), so that the equilibrium now moves from E_1 to E_2. The higher price, however, also reduces demand and so causes demand to shift back, like the shift from the original demand curve, D_0 to D_1 on the diagram (labeled Shift 3), and the equilibrium moves from E_2 to E_3."

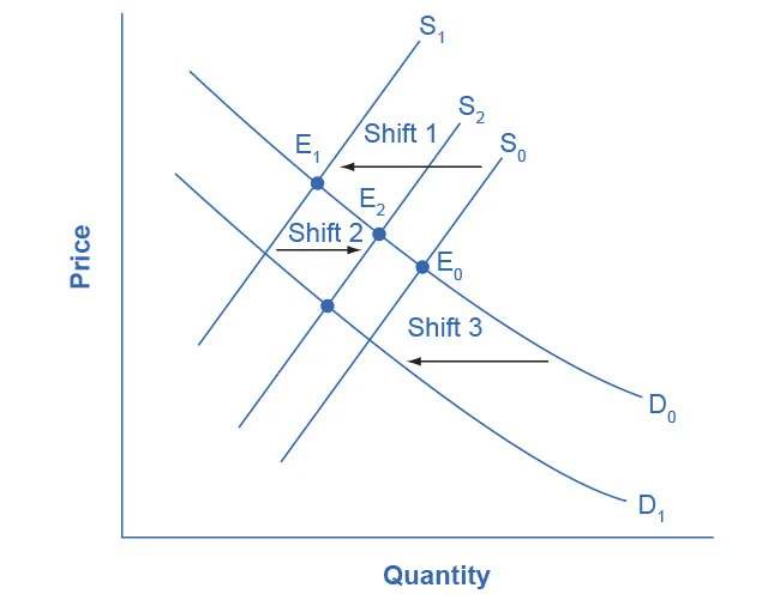


Figure 3.20 Shifts of Demand or Supply versus Movements along a Demand or Supply Curve A shift in one curve never causes a shift in the other curve. Rather, a shift in one curve causes a movement along the second curve.

At about this point, Lee suspects that this answer is headed down the wrong path. Think about what might be wrong with Lee's logic, and then read the answer that follows.

Answer: Lee's first step is correct: that is, a drought shifts back the supply curve of wheat and leads to a prediction of a lower equilibrium quantity and a higher equilibrium price. This corresponds to a movement along the original demand curve (D_0), from E_0 to E_1. The rest of Lee's argument is wrong, because it mixes up shifts in supply with quantity supplied, and shifts in demand with quantity demanded. A higher or lower price never shifts the supply curve, as suggested by the shift in supply from S_1 to S_2. Instead, a price change leads to a movement along a given supply curve. Similarly, a higher or lower price never shifts a demand curve, as suggested in the shift from D_0 to D_1. Instead, a price change leads to a movement along a given demand curve. Remember, a change in the price of a good never causes the demand or supply curve for that good to shift.

Think carefully about the timeline of events: What happens first, what happens next? What is cause, what is effect? If you keep the order right, you are more likely to get the analysis correct.

In the four-step analysis of how economic events affect equilibrium price and quantity, the movement from the old to the new equilibrium seems immediate. As a practical matter, however, prices and quantities often do not zoom straight to equilibrium. More realistically, when an economic event causes demand or supply to shift, prices and quantities set off in the general direction of equilibrium. Even as they are moving toward one new equilibrium, a subsequent change in demand or supply often pushes prices toward another equilibrium.

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3.5: Price Ceilings and Price Floors

Learning Objectives

By the end of this section, you will be able to:

- Explain price controls, price ceilings, and price floors
- Analyze demand and supply as a social adjustment mechanism

To this point in the chapter, we have been assuming that markets are free, that is, they operate with no government intervention. In this section, we will explore the outcomes, both anticipated and otherwise, when government does intervene in a market 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".

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 demand and supply.

Governments can pass laws affecting market outcomes, but no law can negate these economic principles. Rather, the principles will 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 demand and supply, 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."

The demand and supply model shows how people and firms will react to the incentives that these 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 costs and tradeoffs.

Price Ceilings

Laws that governments enact 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 given level (the "floor"). This section uses the demand and supply framework to analyze price ceilings. The next section discusses price floors.

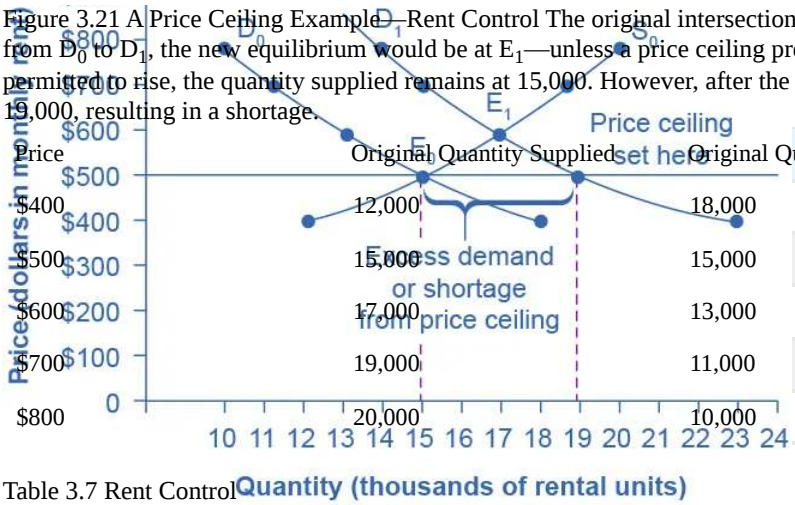
A price ceiling is a legal maximum price that one pays for some good or service. A government imposes price ceilings in order to keep the price of some necessary good or service affordable. For example, in 2005 during Hurricane Katrina, the price of bottled water increased above $5 per gallon. As a result, 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 landlords can raise rents by only a certain maximum percentage each year. Some of the best examples of rent control 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. Such changes can cause a change in the demand for rental housing, as Figure 3.21 illustrates. The original equilibrium (E_0) lies at the intersection of supply curve S_0 and demand curve D_0, corresponding to an equilibrium price of $500 and an equilibrium quantity of 15,000 units of rental housing. The effect of greater income or a change in tastes is to shift the demand curve for rental housing to the right, as the data in Table 3.7 shows and the shift from D_0 to D_1 on the graph. In this market, at the new equilibrium E_1, the price of a rental unit would rise to $600 and the equilibrium quantity would increase to 17,000 units.



Figure 3.21 A Price Ceiling Example—Rent Control The original intersection of demand and supply occurs at E_0. If demand shifts from D_0 to D_1, the new equilibrium would be at E_1—unless a price ceiling prevents the price from rising. If the price is not permitted to rise, the quantity supplied remains at 15,000. However, after the change in demand, the quantity demanded rises to 19,000, resulting in a shortage.



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

Table 3.7 Rent Control

Suppose that a city government passes a rent control law to keep the price at the original equilibrium of $500 for a typical apartment. In Figure 3.21, 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).

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. Thus, if renters obtain “cheaper” housing than the market requires, they tend to also end up with lower quality housing.

Price ceilings are enacted in an attempt to keep prices low for those who need the product. However, 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. Quality is also likely to deteriorate.

Price Floors

A price floor is the lowest price that one can legally pay 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 2022 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. Congress periodically raises the federal minimum wage as the cost of living rises. As of March 2022, the most recent adjustment occurred in 2009, when the federal minimum wage was raised from $6.55 to $7.25.

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 effective in 2019, the European Union (EU) will spend about 58 billion euros per year, or 65.5 billion dollars per year (with the December 2021 exchange rate), or roughly 36% of the EU budget, on price supports for Europe’s farmers.

Figure 3.22 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 keep 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.

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. 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.

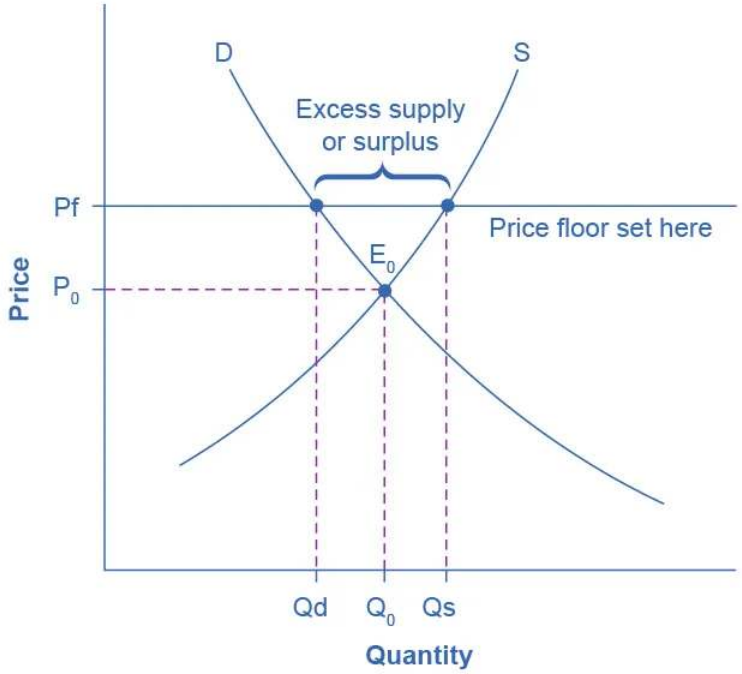


Figure 3.22 European Wheat Prices: A Price Floor Example The intersection of demand (D) and supply (S) would be at the equilibrium point E_0. However, a price floor set at Pf holds the price above E_0 and prevents it from falling. The result of the price floor is that the quantity supplied Qs exceeds the quantity demanded Qd. There is excess supply, also called a surplus.

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3.6: Demand, Supply, and Efficiency

Learning Objectives

By the end of this section, you will be able to:

- Contrast consumer surplus, producer surplus, and social surplus
- Explain why price floors and price ceilings can be inefficient
- Analyze demand and supply as a social adjustment mechanism

The familiar demand and supply diagram holds within it the concept of economic 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 produced and consumed.

Consumer Surplus, Producer Surplus, Social Surplus

Consider a market for tablet computers, as Figure 3.23 shows. The equilibrium price is $80 and the equilibrium quantity is 28 million. To see the benefits to consumers, look at the segment of the demand curve above the equilibrium point and to the left. This portion of the demand curve shows that at least some demanders would have been willing to pay more than $80 for a tablet.

For example, point J shows that if the price were $90, 20 million tablets would be sold. Those consumers who would have been willing to pay $90 for a tablet based on the utility they expect to receive from it, but who were able to pay the equilibrium price of $80, clearly received a benefit beyond what they had to pay. Remember, the demand curve traces consumers' willingness to pay for different quantities. The amount that individuals would have been willing to pay, minus the amount that they actually paid, is called consumer surplus. Consumer surplus is the area labeled F—that is, the area above the market price and below the demand curve.

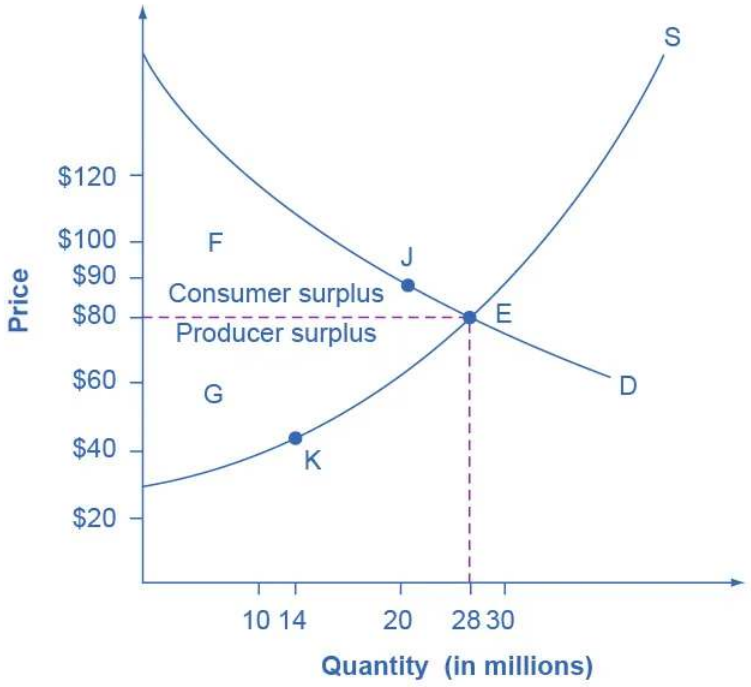


Figure 3.23 Consumer and Producer Surplus The somewhat triangular area labeled by F shows the area of consumer surplus, which shows that the equilibrium price in the market was less than what many of the consumers were willing to pay. Point J on the demand curve shows that, even at the price of $90, consumers would have been willing to purchase a quantity of 20 million. 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. For example, point K on the supply curve shows that at a price of $45, firms would have been willing to supply a quantity of 14 million.

The supply curve shows the quantity that firms are willing to supply at each price. For example, point K in Figure 3.23 illustrates that, at $45, firms would still have been willing to supply a quantity of 14 million. Those producers who would have been willing to supply the tablets at $45, but who were instead able to charge the equilibrium price of $80, clearly received an extra benefit beyond what they required to supply the product. The extra benefit producers receive from selling a good or service, measured by the price the producer actually received minus the price the producer would have been willing to accept is called producer surplus. In Figure 3.23, 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.

The sum of consumer surplus and producer surplus is social surplus, also referred to as economic surplus or total surplus. In Figure 3.23 we show social surplus as the area F + G. Social surplus is larger at equilibrium quantity and price than it would be at any other quantity. This demonstrates the economic efficiency of the market equilibrium. In addition, 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.

Inefficiency of Price Floors and Price Ceilings

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. However, there is an additional twist here. Along with creating inefficiency, price floors and ceilings will also transfer some consumer surplus to producers, or some producer surplus to consumers.

Imagine that several firms develop a promising but expensive new drug for treating back pain. If this therapy is left to the market, the equilibrium price will be $600 per month and 20,000 people will use the drug, as shown in Figure 3.24 (a). The original level of consumer surplus is T + U and producer surplus is V + W + X. However, the government decides to impose a price ceiling of $400 to make the drug more affordable. At this price ceiling, firms in the market now produce only 15,000.

As a result, 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 Figure 3.24 (a), the deadweight loss is 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 they would both be willing to make.

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.

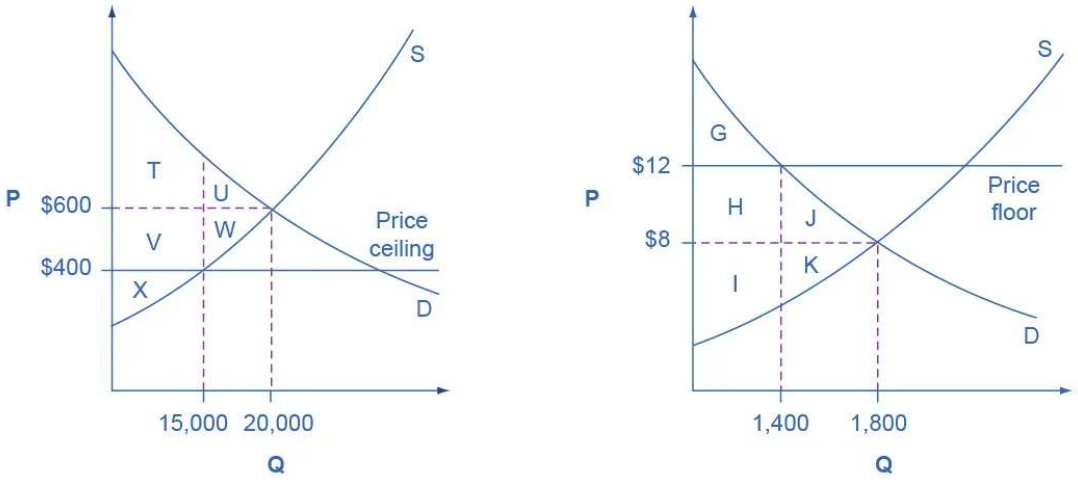


Figure 3.24 Efficiency and Price Floors and Ceilings (a) The original equilibrium price is $600 with a quantity of 20,000. Consumer surplus is T + U, and producer surplus is V + W + X. A price ceiling is imposed at $400, so firms in the market now produce only a quantity of 15,000. As a result, the new consumer surplus is T + V, while the new producer surplus is X. (b) The original equilibrium is $8 at a quantity of 1,800. Consumer surplus is G + H + J, and producer surplus is I + K. A price floor is imposed at $12, which means that quantity demanded falls to 1,400. As a result, the new consumer surplus is G, and the new producer surplus is H + I.

Figure 3.24 (b) shows a price floor example using a string of struggling movie theaters, all in the same city. The current equilibrium is $8 per movie ticket, with 1,800 people attending movies. The original consumer surplus is G + H + J, and producer surplus is I + K. The city government is worried that movie theaters will go out of business, reducing the entertainment options available to citizens, so it decides to impose a price floor of $12 per ticket. As a result, the quantity demanded of movie tickets falls to 1,400. The new consumer surplus is G, and the new producer surplus is H + I. In effect, 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.

Demand and Supply as a Social Adjustment Mechanism

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.

The adjustments of equilibrium price and quantity in a market-oriented economy often occur without much government direction or oversight. If the coffee crop in Brazil suffers a terrible frost, then the supply curve of coffee shifts to the left and the price of coffee rises. Some people 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.

Bring It Home

Why Can We Not Get Enough of Organic Food?

Organic food is grown without synthetic pesticides, chemical fertilizers or genetically modified seeds. In recent decades, the demand for organic products has increased dramatically. The Organic Trade Association reported sales increased from $1 billion in 1990 to nearly $62 billion in 2020, more than 90% of which were sales of food products.

Why, then, are organic foods more expensive than their conventional counterparts? The answer is a clear application of the theories of supply and demand. As people have learned more about the harmful effects of chemical fertilizers, growth hormones, pesticides and the like from large-scale factory farming, our tastes and preferences for safer, organic foods have increased. This change in tastes has been reinforced by increases in income, which allow people to purchase pricier products, and has made organic foods more mainstream. This shift, in addition to population growth, has led to an increased demand for organic foods. Graphically, the demand curve has shifted right, and we have moved up the supply curve as producers have responded to the higher prices by supplying a greater quantity.

In addition to the movement along the supply curve, we have also had an increase in the number of farmers converting to organic farming over time. This is represented by a shift to the right of the supply curve. Since both demand and supply have shifted to the right, the resulting equilibrium quantity of organic foods is definitely higher, but the price will only fall when the increase in supply is larger than the increase in demand. We may need more time before we see lower prices in organic foods. Since the production costs of these foods may remain higher than conventional farming, because organic fertilizers and pest management techniques are more expensive, they may never fully catch up with the lower prices of non-organic foods.

As a final, specific example: The Environmental Working Group's "Dirty Dozen" list of fruits and vegetables, which test high for pesticide residue even after washing, was released in April 2013. The inclusion of strawberries on the list led to an increase in demand for organic strawberries, resulting in both a higher equilibrium price and quantity of sales.

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3.7: Key Terms

ceteris paribus
other things being equal

complements
goods that are often used together so that consumption of one good tends to enhance consumption of the other

consumer surplus
the extra benefit consumers receive from buying a good or service, measured by what the individuals would have been willing to pay minus the amount that they actually paid

deadweight loss
the loss in social surplus that occurs when a market produces an inefficient quantity

demand
the relationship between price and the quantity demanded of a certain good or service

demand curve
a graphic representation of the relationship between price and quantity demanded of a certain good or service, with quantity on the horizontal axis and the price on the vertical axis

demand schedule
a table that shows a range of prices for a certain good or service and the quantity demanded at each price

economic surplus
see social surplus

equilibrium
the situation where quantity demanded is equal to the quantity supplied; the combination of price and quantity where there is no economic pressure from surpluses or shortages that would cause price or quantity to change

equilibrium price
the price where quantity demanded is equal to quantity supplied

equilibrium quantity
the quantity at which quantity demanded and quantity supplied are equal for a certain price level

excess demand
at the existing price, the quantity demanded exceeds the quantity supplied; also called a shortage

excess supply
at the existing price, quantity supplied exceeds the quantity demanded; also called a surplus

factors of production
the resources such as labor, materials, and machinery that are used to produce goods and services; also called inputs

inferior good
a good in which the quantity demanded falls as income rises, and in which quantity demanded rises and income falls

inputs
the resources such as labor, materials, and machinery that are used to produce goods and services; also called factors of production

law of demand

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

law of supply

the common relationship that a higher price leads to a greater quantity supplied and a lower price leads to a lower quantity supplied, while all other variables are held constant

normal good

a good in which the quantity demanded rises as income rises, and in which quantity demanded falls as income falls

price

what a buyer pays for a unit of the specific good or service

price ceiling

a legal maximum price

price control

government laws to regulate prices instead of letting market forces determine prices

price floor

a legal minimum price

producer surplus

the extra benefit producers receive from selling a good or service, measured by the price the producer actually received minus the price the producer would have been willing to accept

quantity demanded

the total number of units of a good or service consumers are willing to purchase at a given price

quantity supplied

the total number of units of a good or service producers are willing to sell at a given price

shift in demand

when a change in some economic factor (other than price) causes a different quantity to be demanded at every price

shift in supply

when a change in some economic factor (other than price) causes a different quantity to be supplied at every price

shortage

at the existing price, the quantity demanded exceeds the quantity supplied; also called excess demand

social surplus

the sum of consumer surplus and producer surplus

substitute

a good that can replace another to some extent, so that greater consumption of one good can mean less of the other

supply

the relationship between price and the quantity supplied of a certain good or service

supply curve

a line that shows the relationship between price and quantity supplied on a graph, with quantity supplied on the horizontal axis and price on the vertical axis

supply schedule

a table that shows a range of prices for a good or service and the quantity supplied at each price

surplus

at the existing price, quantity supplied exceeds the quantity demanded; also called excess supply

total surplus

see social surplus

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3.8: Key Concepts and Summary

3.1 Demand, Supply, and Equilibrium in Markets for Goods and Services

A demand schedule is a table that shows the quantity demanded at different prices in the market. A demand curve shows the relationship between quantity demanded and price in a given market on a graph. The law of demand states that a higher price typically leads to a lower quantity demanded.

A supply schedule is a table that shows the quantity supplied at different prices in the market. A supply curve shows the relationship between quantity supplied and price on a graph. The law of supply says that a higher price typically leads to a higher quantity supplied.

The equilibrium price and equilibrium quantity occur where the supply and demand curves cross. The equilibrium occurs where the quantity demanded is equal to the quantity supplied. If the price is below the equilibrium level, then the quantity demanded will exceed the quantity supplied. Excess demand or a shortage will exist. If the price is above the equilibrium level, then the quantity supplied will exceed the quantity demanded. Excess supply or a surplus will exist. In either case, economic pressures will push the price toward the equilibrium level.

3.2 Shifts in Demand and Supply for Goods and Services

Economists often use the *ceteris paribus* or "other things being equal" assumption: while examining the economic impact of one event, all other factors remain unchanged for analysis purposes. Factors that can shift the demand curve for goods and services, causing a different quantity to be demanded at any given price, include changes in tastes, population, income, prices of substitute or complement goods, and expectations about future conditions and prices. Factors that can shift the supply curve for goods and services, causing a different quantity to be supplied at any given price, include input prices, natural conditions, changes in technology, and government taxes, regulations, or subsidies.

3.3 Changes in Equilibrium Price and Quantity: The Four-Step Process

When using the supply and demand framework to think about how an event will affect the equilibrium price and quantity, proceed through four steps: (1) sketch a supply and demand diagram to think about what the market looked like before the event; (2) decide whether the event will affect supply or demand; (3) decide whether the effect on supply or demand is negative or positive, and draw the appropriate shifted supply or demand curve; (4) compare the new equilibrium price and quantity to the original ones.

3.4 Price Ceilings and Price Floors

Price ceilings prevent a price from rising above a certain level. When a price ceiling is set below the equilibrium price, quantity demanded will exceed quantity supplied, and excess demand or shortages will result. Price floors prevent a price from falling below a certain level. When a price floor is set above the equilibrium price, quantity supplied will exceed quantity demanded, and excess supply or surpluses will result. Price floors and price ceilings often lead to unintended consequences.

3.5 Demand, Supply, and Efficiency

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. Total surplus is larger at the equilibrium quantity and price than it will be at any other quantity and price. Deadweight loss is loss in total surplus that occurs when the economy produces at an inefficient quantity.

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CHAPTER OVERVIEW

4: The International Trade and Capital Flows

4.1: Introduction to the International Trade and Capital Flows
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4.3: Trade Balances in Historical and International Context
4.4: Trade Balances and Flows of Financial Capital
4.5: The National Saving and Investment Identity
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4.1: Introduction to the International Trade and Capital Flows



Figure 10.1 A World of Money We are all part of the global financial system, which includes many different currencies. (Credit: modification of "Money from around the world" by Images Money/Flickr, CC BY 2.0)

Chapter Objectives

In this chapter, you will learn about:

- Measuring Trade Balances
- Trade Balances in Historical and International Context
- Trade Balances and Flows of Financial Capital
- The National Saving and Investment Identity
- The Pros and Cons of Trade Deficits and Surpluses
- The Difference between Level of Trade and the Trade Balance

Bring It Home

More than Meets the Eye in the Congo

How much do you interact with the global financial system? Do you think not much? Think again. Suppose you take out a student loan, or you deposit money into your bank account. You just affected domestic savings and borrowing. Now say you are at the mall and buy two T-shirts “made in China,” and later contribute to a charity that helps refugees. What is the impact? You affected how much money flows into and out of the United States. If you open an IRA savings account and put money in an international mutual fund, you are involved in the flow of money overseas. While your involvement may not seem as influential as that of someone like the president, who can increase or decrease foreign aid and, thereby, have a huge impact on money flows in and out of the country, you do interact with the global financial system on a daily basis.

The balance of payments—a term you will meet soon—seems like a huge topic, but once you learn the specific components of trade and money, it all makes sense. Along the way, you may have to give up some common misunderstandings about trade and answer some questions: If a country is running a trade deficit, is that bad? Is a trade surplus good? For example, look at the Democratic Republic of the Congo (often referred to as “Congo”), a large country in Central Africa. In 2013, it ran a trade surplus of $1 billion, so it must be doing well, right? In contrast, the trade deficit in the United States was $508 billion in 2013. Do these figures suggest that the United States economy is performing worse than the Congolese economy? Not necessarily.

> The U.S. trade deficit tends to worsen as the economy strengthens. In contrast, high poverty rates in the Congo persist, and these rates are not going down even with the positive trade balance. Clearly, it is more complicated than simply asserting that running a trade deficit is bad for the economy. You will learn more about these issues and others in this chapter.

The balance of trade (or trade balance) is any gap between a nation's dollar value of its exports, or what its producers sell abroad, and a nation's dollar value of imports, or the foreign-made products and services that households and businesses purchase. Recall from The Macroeconomic Perspective that if exports exceed imports, the economy has a trade surplus. If imports exceed exports, the economy has a trade deficit. If exports and imports are equal, then trade is balanced, but what happens when trade is out of balance and large trade surpluses or deficits exist?

Germany, for example, has had substantial trade surpluses in recent decades, in which exports have greatly exceeded imports. According to the World Bank, in 2020, Germany ran a trade surplus of $242 billion. In contrast, the U.S. economy in recent decades has experienced large trade deficits, in which imports have considerably exceeded exports. In 2020, for example, U.S. imports exceeded exports by $651 billion.

A series of financial crises triggered by unbalanced trade can lead economies into deep recessions. These crises begin with large trade deficits. At some point, foreign investors become pessimistic about the economy and move their money to other countries. The economy then drops into deep recession, with real GDP often falling up to 10% or more in a single year. This happened to Mexico in 1995 when their GDP fell 8.1%. A number of countries in East Asia—Thailand, South Korea, Malaysia, and Indonesia—succumbed to the same economic illness in 1997–1998 (called the Asian Financial Crisis). In the late 1990s and into the early 2000s, Russia and Argentina had the identical experience. What are the connections between imbalances of trade in goods and services and the flows of international financial capital that set off these economic avalanches?

We will start by examining the balance of trade in more detail, by looking at some patterns of trade balances in the United States and around the world. Then we will examine the intimate connection between international flows of goods and services and international flows of financial capital, which to economists are really just two sides of the same coin. People often assume that trade surpluses like those in Germany must be a positive sign for an economy, while trade deficits like those in the United States must be harmful. As it turns out, both trade surpluses and deficits can be either good or bad. We will see why in this chapter.

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4.2: Measuring Trade Balances

Learning Objectives

By the end of this section, you will be able to:

- Explain merchandise trade balance, current account balance, and unilateral transfers
- Identify components of the U.S. current account balance
- Calculate the merchandise trade balance and current account balance using import and export data for a country

A few decades ago, it was common to track the solid or physical items that planes, trains, and trucks transported between countries as a way of measuring the balance of trade. Economists call this measurement the merchandise trade balance. In most high-income economies, including the United States, goods comprise less than half of a country's total production, while services comprise more than half. The last two decades have seen a surge in international trade in services, powered by technological advances in telecommunications and computers that have made it possible to export or import customer services, finance, law, advertising, management consulting, software, construction engineering, and product design. Most global trade still takes the form of goods rather than services, and the government announces and the media prominently report the merchandise trade balance. Old habits are hard to break. Economists, however, typically rely on broader measures such as the balance of trade or the current account balance which includes other international flows of income and foreign aid.

Components of the U.S. Current Account Balance

Table 10.1 breaks down the four main components of the U.S. current account balance for the last quarter of 2015 (seasonally adjusted). The first line shows the merchandise trade balance; that is, exports and imports of goods. Because imports exceed exports, the trade balance in the final column is negative, showing a merchandise trade deficit. We can explain how the government collects this trade information in the following Clear It Up feature.

	Value of Exports (money flowing into the United States)	Value of Imports (money flowing out of the United States)	Balance
Goods	$1,428.8	$2,350.8	–$922.0
Services	$705.6	$460.3	$245.3
Income receipts and payments	$957.9	$769.4	$188.5
Unilateral transfers	$166.3	$294.2	–$127.9
Current account balance	$3,258.6	$3,874.7	–$616.1

Table 10.1 Components of the U.S. Current Account Balance for 2020 (in billions of dollars). Source: https://apps.bea.gov/itable/index.cfm, ITA Table 1.1.

Clear It Up

How does the U.S. government collect trade statistics?

Do not confuse the balance of trade (which tracks imports and exports), with the current account balance, which includes not just exports and imports, but also income from investment and transfers.

The Bureau of Economic Analysis (BEA) within the U.S. Department of Commerce compiles statistics on the balance of trade using a variety of different sources. Merchandise importers and exporters must file monthly documents with the Census Bureau, which provides the basic data for tracking trade. To measure international trade in services—which can happen over a telephone line or computer network without shipping any physical goods—the BEA carries out a set of surveys. Another set of BEA surveys tracks investment flows, and there are even specific surveys to collect travel information from U.S. residents

visiting Canada and Mexico. For measuring unilateral transfers, the BEA has access to official U.S. government spending on aid, and then also carries out a survey of charitable organizations that make foreign donations.

The BEA then cross-checks this information on international flows of goods and capital against other available data. For example, the Census Bureau also collects data from the shipping industry, which it can use to check the data on trade in goods. All companies involved in international flows of capital—including banks and companies making financial investments like stocks—must file reports, which the U.S. Department of the Treasury ultimately checks. The BEA also can cross check information on foreign trade by looking at data collected by other countries on their foreign trade with the United States, and also at the data collected by various international organizations. Take these data sources, stir carefully, and you have the U.S. balance of trade statistics. Much of the statistics that we cite in this chapter come from these sources.

The second row of Table 10.1 provides data on trade in services. Here, the U.S. economy is running a surplus. Although the level of trade in services is still relatively small compared to trade in goods, the importance of services has expanded substantially over the last few decades. For example, U.S. exports of services were equal to about one-half of U.S. exports of goods in 2020, compared to one-fifth in 1980.

The third component of the current account balance, labeled “income payments,” refers to money that U.S. financial investors received on their foreign investments (money flowing into the United States) and payments to foreign investors who had invested their funds here (money flowing out of the United States). The reason for including this money on foreign investment in the overall measure of trade, along with goods and services, is that, from an economic perspective, income is just as much an economic transaction as car, wheat, or oil shipments: it is just trade that is happening in the financial capital market.

The final category of the current account balance is unilateral transfers, which are payments that government, private charities, or individuals make in which they send money abroad without receiving any direct good or service. Economic or military assistance from the U.S. government to other countries fits into this category, as does spending abroad by charities to address poverty or social inequalities. When an individual in the United States sends money overseas, as is the case with some immigrants, it is also counted in this category. The current account balance treats these unilateral payments like imports, because they also involve a stream of payments leaving the country. For the U.S. economy, unilateral transfers are almost always negative. This pattern, however, does not always hold. In 1991, for example, when the United States led an international coalition against Saddam Hussein’s Iraq in the Gulf War, many other nations agreed that they would make payments to the United States to offset the U.S. war expenses. These payments were large enough that, in 1991, the overall U.S. balance on unilateral transfers was a positive $10 billion.

The following Work It Out feature steps you through the process of using the values for goods, services, and income payments to calculate the merchandise balance and the current account balance.

Work It Out

Calculating the Merchandise Balance and the Current Account Balance

	Exports (in $ billions)	Imports (in $ billions)	Balance
Goods			
Services			
Income payments			
Unilateral transfers			
Current account balance			

Table 10.2 Calculating Merchandise Balance and Current Account Balance

Use the information given below to fill in Table 10.2, and then calculate:

- The merchandise balance
- The current account balance

Known information:

- Unilateral transfers: $130
- Exports in goods: $1,046
- Exports in services: $509
- Imports in goods: $1,562
- Imports in services: $371
- Income received by U.S. investors on foreign stocks and bonds: $561
- Income received by foreign investors on U.S. assets: $472

Step 1. Focus on goods and services first. Enter the dollar amount of exports of both goods and services under the Export column.

Step 2. Enter imports of goods and services under the Import column.

Step 3. Under the Export column and in the row for Income payments, enter the financial flows of money coming back to the United States. U.S. investors are earning this income from abroad.

Step 4. Under the Import column and in the row for Income payments, enter the financial flows of money going out of the United States to foreign investors. Foreign investors are earning this money on U.S. assets, like stocks.

Step 5. Unilateral transfers are money flowing out of the United States in the form of, for example, military aid, foreign aid, and global charities. Because the money leaves the country, enter it under Imports and in the final column as well, as a negative.

Step 6. Calculate the trade balance by subtracting imports from exports in both goods and services. Enter this in the final Balance column. This can be positive or negative.

Step 7. Subtract the income payments flowing out of the country (under Imports) from the money coming back to the United States (under Exports) and enter this amount under the Balance column.

Step 8. Enter unilateral transfers as a negative amount under the Balance column.

Step 9. The merchandise trade balance is the difference between exports of goods and imports of goods—the first number under Balance.

Step 10. Now sum up your columns for Exports, Imports, and Balance. The final balance number is the current account balance.

The merchandise balance of trade is the difference between exports and imports. In this case, it is equal to $1,046 – $1,562, a trade deficit of –$516 billion. The current account balance is –$419 billion. See the completed Table 10.3.

	Value of Exports (money flowing into the United States)	Value of Imports (money flowing out of the United States)	Balance
Goods	$1,046	$1,562	–$516
Services	$509	$371	$138
Income receipts and payments	$561	$472	$89
Unilateral transfers	$0	$130	–$130
Current account balance	$2,116	$2,535	–$419

Table 10.3 Completed Merchandise Balance and Current Account Balance

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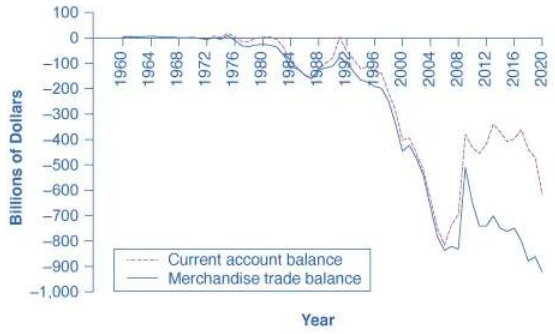
4.3: Trade Balances in Historical and International Context

Learning Objectives

By the end of this section, you will be able to:

- Analyze graphs of the current account balance and the merchandise trade balance
- Identify patterns in U.S. trade surpluses and deficits
- Compare the U.S. trade surpluses and deficits to other countries' trade surpluses and deficits

We present the history of the U.S. current account balance in recent decades in several different ways. Figure 10.2 (a) shows the current account balance and the merchandise trade balance—the latter of which is simply the balance on goods exported versus imported—in dollar terms. Figure 10.2 (b) shows the current account balance and merchandise account balance yet again, this time as a share of the GDP for that year. By dividing the trade deficit in each year by GDP in that year, Figure 10.2 (b) factors out both inflation and growth in the real economy.



(a) The current account and merchandise trade balance in nominal dollars



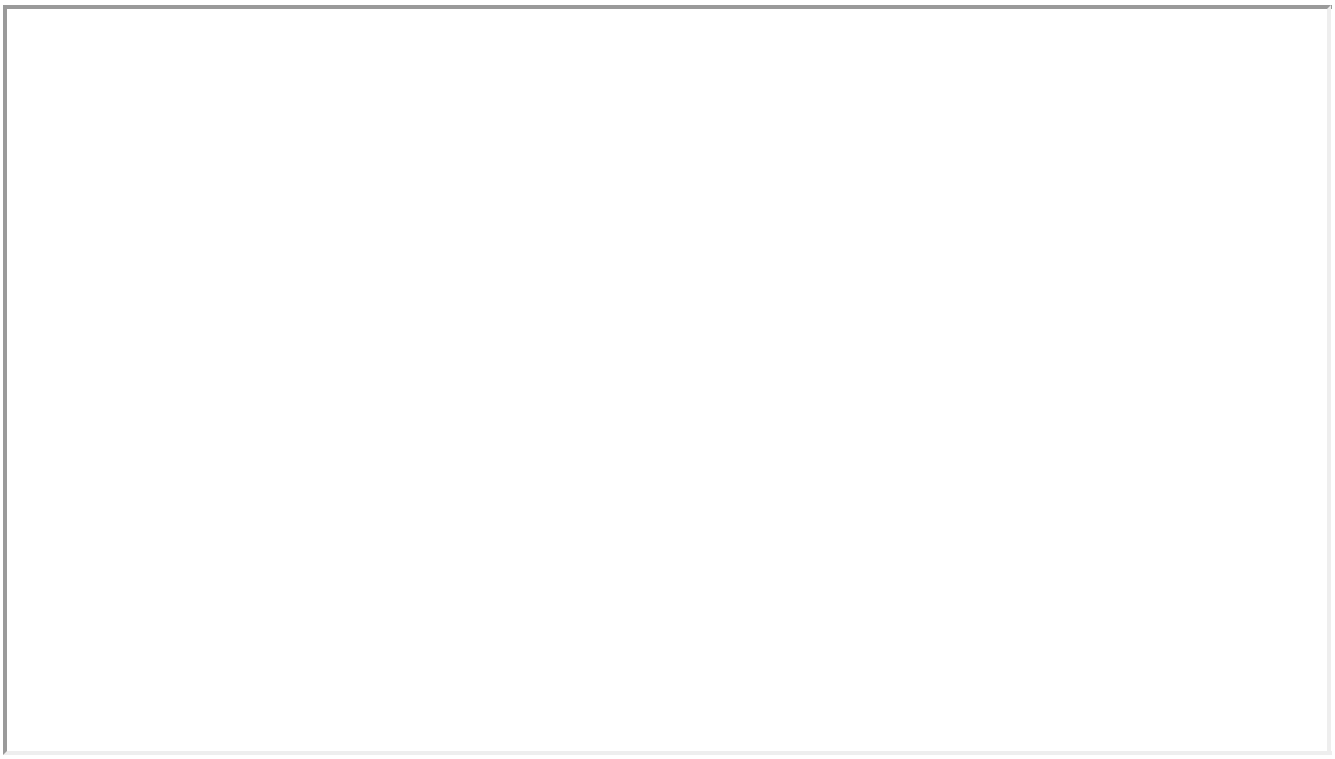
(b) The current account and merchandise trade balance as a percentage of GDP

Figure 10.2 Current Account Balance and Merchandise Trade Balance, 1960–2020 (a) The current account balance and the merchandise trade balance in billions of dollars from 1960 to 2020. The merchandise trade balance is the trade balance on goods only. If the lines are above zero dollars, the United States was running a positive trade balance and current account balance. If the lines fall below zero dollars, the United States is running a trade deficit and a deficit in its current account balance. (b) This shows the same items—trade balance and current account balance—in relationship to the size of the U.S. economy, or GDP, from 1960 to 2020.

By either measure, the U.S. balance of trade pattern is clear. From the 1960s into the 1970s, the U.S. economy had mostly small trade surpluses—that is, the graphs in Figure 10.2 show positive numbers. However, starting in the 1980s, the trade deficit increased rapidly, and after a tiny surplus in 1991, the current account trade deficit became even larger in the late 1990s and into the

mid-2000s. However, the trade deficit declined in 2009 after the recession had taken hold, then rebounded partially in 2010 and remained stable up through 2019, before falling again in 2020.

Click to view content



Current Account Balance in Billions of Dollars.

Table 10.4 shows the U.S. trade picture in 2013 compared with some other economies from around the world. While the U.S. economy has consistently run trade deficits in recent years, Japan and many European nations, among them France and Germany, have consistently run trade surpluses. Some of the other countries listed include Brazil, the largest economy in Latin America; Nigeria, along with South Africa competing to be the largest economy in Africa; and China, India, and Korea. The first column offers one measure of an economy's globalization: exports of goods and services as a percentage of GDP. The second column shows the trade balance. Usually, most countries have trade surpluses or deficits that are less than 5% of GDP. As you can see, the U.S. current account balance is –2.6% of GDP, while Germany's is 8.4% of GDP.

	Exports of Goods and Services	Current Account Balance
United States	10.2%	–2.9%
Japan	15.5%	3.2%
Germany	43.4%	7.0%
United Kingdom	27.9%	–2.6%
Canada	29.0%	–1.8%
Sweden	44.6%	5.7%
Korea	36.4%	4.6%
Mexico	40.2%	2.4%
Brazil	16.9%	–1.8%
China	18.5%	1.9%
India	18.7%	1.2%
Nigeria	8.8%	–3.9%
World	-	0.0%

Table 10.4 Level and Balance of Trade (Balance of Payments basis) in 2020 (figures as a percentage of GDP, Source: http://data.worldbank.org/indicator/BN.CAB.XOKA.GD.ZS)

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4.4: Trade Balances and Flows of Financial Capital

Learning Objectives

By the end of this section, you will be able to:

- Explain the connection between trade balances and financial capital flows
- Calculate comparative advantage
- Explain balanced trade in terms of investment and capital flows

As economists see it, trade surpluses can be either good or bad, depending on circumstances, and trade deficits can be good or bad, too. The challenge is to understand how the international flows of goods and services are connected with international flows of financial capital. In this module we will illustrate the intimate connection between trade balances and flows of financial capital in two ways: a parable of trade between Robinson Crusoe and Friday, and a circular flow diagram representing flows of trade and payments.

A Two-Person Economy: Robinson Crusoe and Friday

To understand how economists view trade deficits and surpluses, consider a parable based on the story of Robinson Crusoe. Crusoe, as you may remember from the classic novel by Daniel Defoe first published in 1719, was shipwrecked on a desert island. After living alone for some time, he is joined by a second person, whom he names Friday. Think about the balance of trade in a two-person economy like that of Robinson and Friday.

Robinson and Friday trade goods and services. Perhaps Robinson catches fish and trades them to Friday for coconuts, or Friday weaves a hat out of tree fronds and trades it to Robinson for help in carrying water. For a period of time, each individual trade is self-contained and complete. Because each trade is voluntary, both Robinson and Friday must feel that they are receiving fair value for what they are giving. As a result, each person's exports are always equal to his imports, and trade is always in balance between the two. Neither person experiences either a trade deficit or a trade surplus.

However, one day Robinson approaches Friday with a proposition. Robinson wants to dig ditches for an irrigation system for his garden, but he knows that if he starts this project, he will not have much time left to fish and gather coconuts to feed himself each day. He proposes that Friday supply him with a certain number of fish and coconuts for several months, and then after that time, he promises to repay Friday out of the extra produce that he will be able to grow in his irrigated garden. If Friday accepts this offer, then a trade imbalance comes into being. For several months, Friday will have a trade surplus: that is, he is exporting to Robinson more than he is importing. More precisely, he is giving Robinson fish and coconuts, and at least for the moment, he is receiving nothing in return. Conversely, Robinson will have a trade deficit, because he is importing more from Friday than he is exporting.

This parable raises several useful issues in thinking about what a trade deficit and a trade surplus really mean in economic terms. The first issue that this story of Robinson and Friday raises is this: Is it better to have a trade surplus or a trade deficit? The answer, as in any voluntary market interaction, is that if both parties agree to the transaction, then they may both be better off. Over time, if Robinson's irrigated garden is a success, it is certainly possible that both Robinson and Friday can benefit from this agreement.

The parable raises a second issue: What can go wrong? Robinson's proposal to Friday introduces an element of uncertainty. Friday is, in effect, making a loan of fish and coconuts to Robinson, and Friday's happiness with this arrangement will depend on whether Robinson repays that loan as planned, in full and on time. Perhaps Robinson spends several months loafing and never builds the irrigation system, or perhaps Robinson has been too optimistic about how much he will be able to grow with the new irrigation system, which turns out not to be very productive. Perhaps, after building the irrigation system, Robinson decides that he does not want to repay Friday as much as he previously agreed. Any of these developments will prompt a new round of negotiations between Friday and Robinson. Why the repayment failed is likely to shape Friday's attitude toward these renegotiations. If Robinson worked very hard and the irrigation system just did not increase production as intended, Friday may have some sympathy. If Robinson loafed or if he just refuses to pay, Friday may become irritated.

A third issue that the parable raises is that an intimate relationship exists between a trade deficit and international borrowing, and between a trade surplus and international lending. The size of Friday's trade surplus is exactly how much he is lending to Robinson. The size of Robinson's trade deficit is exactly how much he is borrowing from Friday. To economists, a trade surplus literally

means the same thing as an outflow of financial capital, and a trade deficit literally means the same thing as an inflow of financial capital. This last insight is worth exploring in greater detail, which we will do in the following section.

The story of Robinson and Friday also provides a good opportunity to consider the law of comparative advantage, which you learn more about in the International Trade chapter. The following Work It Out feature steps you through calculating comparative advantage for the wheat and cloth traded between the United States and Great Britain in the 1800s.

Work It Out

Calculating Comparative Advantage

In the 1800s, the United States and Britain traded wheat and cloth. Table 10.5 shows the varying hours of labor per unit of output.

	Wheat (in bushels)	Cloth (in yards)	Relative labor cost of wheat (Pw/Pc)	Relative labor cost of cloth (Pc/Pw)
United States	8	9	8/9	9/8
Britain	4	3	4/3	3/4

Table 10.5

Step 1. Observe from Table 10.5 that, in the United States, it takes eight hours to supply a bushel of wheat and nine hours to supply a yard of cloth. In contrast, it takes four hours to supply a bushel of wheat and three hours to supply a yard of cloth in Britain.

Step 2. Recognize the difference between absolute advantage and comparative advantage. Britain has an absolute advantage (lowest cost) in each good, since it takes a lower amount of labor to make each good in Britain. Britain also has a comparative advantage in the production of cloth (lower opportunity cost in cloth (3/4 versus 9/8)). The United States has a comparative advantage in wheat production (lower opportunity cost of 8/9 versus 4/3).

Step 3. Determine the relative price of one good in terms of the other good. The price of wheat, in this example, is the amount of cloth you have to give up. To find this price, convert the hours per unit of wheat and cloth into units per hour. To do so, observe that in the United States it takes eight hours to make a bushel of wheat, so workers can process 1/8 of a bushel of wheat in an hour. It takes nine hours to make a yard of cloth in the United States, so workers can produce 1/9 of a yard of cloth in an hour. If you divide the amount of cloth (1/9 of a yard) by the amount of wheat you give up (1/8 of a bushel) in an hour, you find the price (8/9) of one good (wheat) in terms of the other (cloth).

The Balance of Trade as the Balance of Payments

The connection between trade balances and international flows of financial capital is so close that economists sometimes describe the balance of trade as the balance of payments. Each category of the current account balance involves a corresponding flow of payments between a given country and the rest of the world economy.

Figure 10.3 shows the flow of goods and services and payments between one country—the United States in this example—and the rest of the world. The top line shows U.S. exports of goods and services, while the second line shows financial payments from purchasers in other countries back to the U.S. economy. The third line then shows U.S. imports of goods, services, and investment, and the fourth line shows payments from the home economy to the rest of the world. Flow of goods and services (lines one and three) show up in the current account, while we find flow of funds (lines two and four) in the financial account.

The bottom four lines in Figure 10.3 show the flows of investment income. In the first of the bottom lines, we see investments made abroad with funds flowing from the home country to the rest of the world. Investment income stemming from an investment abroad then runs in the other direction from the rest of the world to the home country. Similarly, we see on the bottom third line, an investment from the rest of the world into the home country and investment income (bottom fourth line) flowing from the home country to the rest of the world. We find the investment income (bottom lines two and four) in the current account, while investment to the rest of the world or into the home country (lines one and three) is in the financial account. This figure does not show unilateral transfers, the fourth item in the current account.

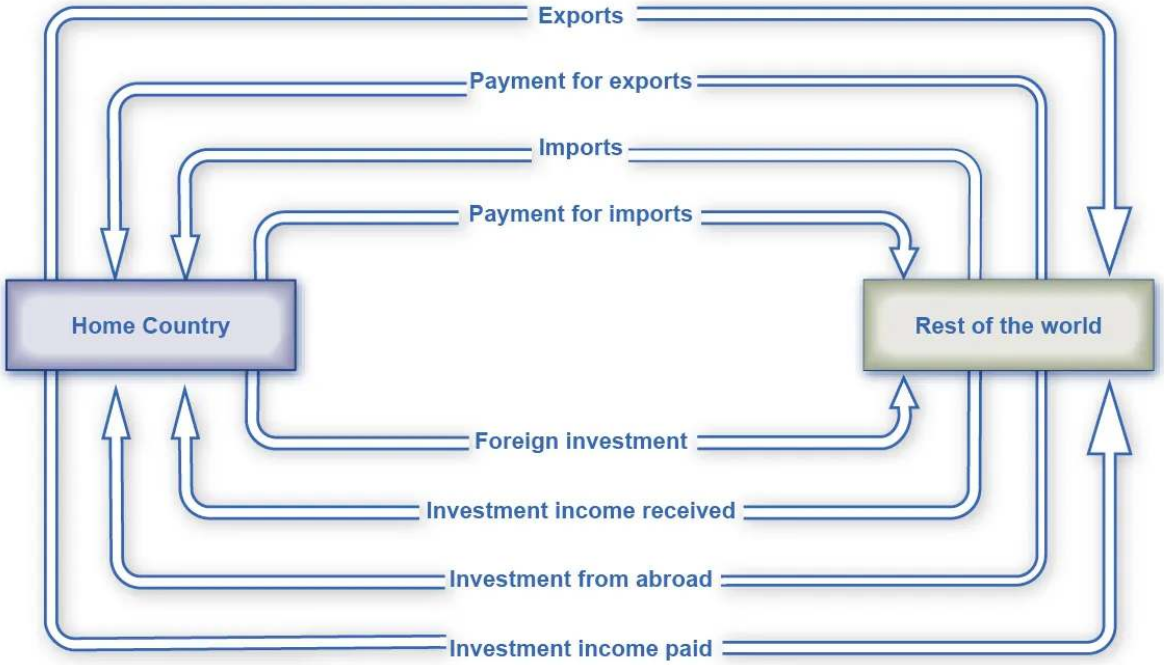


Figure 10.3 Flow of Investment Goods and Capital Each element of the current account balance involves a flow of financial payments between countries. The top line shows exports of goods and services leaving the home country; the second line shows the money that the home country receives for those exports. The third line shows imports that the home country receives; the fourth line shows the payments that the home country sent abroad in exchange for these imports.

A current account deficit means that, the country is a net borrower from abroad. Conversely, a positive current account balance means a country is a net lender to the rest of the world. Just like the parable of Robinson and Friday, the lesson is that a trade surplus means an overall outflow of financial investment capital, as domestic investors put their funds abroad, while a deficit in the current account balance is exactly equal to the overall or net inflow of foreign investment capital from abroad.

It is important to recognize that an inflow and outflow of foreign capital does not necessarily refer to a debt that governments owe to other governments, although government debt may be part of the picture. Instead, these international flows of financial capital refer to all of the ways in which private investors in one country may invest in another country—by buying real estate, companies, and financial investments like stocks and bonds.

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4.5: The National Saving and Investment Identity

Learning Objectives

By the end of this section, you will be able to:

- Explain the determinants of trade and current account balance
- Identify and calculate supply and demand for financial capital
- Explain how a nation's own level of domestic saving and investment determines a nation's balance of trade
- Predict the rising and falling of trade deficits based on a nation's saving and investment identity

The close connection between trade balances and international flows of savings and investments leads to a macroeconomic analysis. This approach views trade balances—and their associated flows of financial capital—in the context of the overall levels of savings and financial investment in the economy.

Understanding the Determinants of the Trade and Current Account Balance

The national saving and investment identity provides a useful way to understand the determinants of the trade and current account balance. In a nation's financial capital market, the quantity of financial capital supplied at any given time must equal the quantity of financial capital demanded for purposes of making investments. What is on the supply and demand sides of financial capital? See the following Clear It Up feature for the answer to this question.

Clear It Up

What comprises the supply and demand of financial capital?

A country's national savings is the total of its domestic savings by household and companies (private savings) as well as the government (public savings). If a country is running a trade deficit, it means money from abroad is entering the country and the government considers it part of the supply of financial capital.

The demand for financial capital (money) represents groups that are borrowing the money. Businesses need to borrow to finance their investments in factories, materials, and personnel. When the federal government runs a budget deficit, it is also borrowing money from investors by selling Treasury bonds. Therefore, both business investment and the federal government can demand (or borrow) the supply of savings.

There are two main sources for the supply of financial capital in the U.S. economy: saving by individuals and firms, called S, and the inflow of financial capital from foreign investors, which is equal to the trade deficit (M – X), or imports minus exports. There are also two main sources of demand for financial capital in the U.S. economy: private sector investment, I, and government borrowing, where the government needs to borrow when government spending, G, is higher than the taxes collected, T. We can express this national savings and investment identity in algebraic terms:

Supply of financial capital = Demand for financial capitalS + (M – X) = I + (G – T)Supply of financial capital = Demand for financial capitalS + (M – X) = I + (G – T)

Again, in this equation, S is private savings, T is taxes, G is government spending, M is imports, X is exports, and I is investment. This relationship is true as a matter of definition because, for the macro economy, the quantity supplied of financial capital must be equal to the quantity demanded.

However, certain components of the national savings and investment identity can switch between the supply side and the demand side. Some countries, like the United States in most years since the 1970s, have budget deficits, which mean the government is spending more than it collects in taxes, and so the government needs to borrow funds. In this case, the government term would be $G – T > 0$, showing that spending is larger than taxes, and the government would be a demander of financial capital on the left-hand side of the equation (that is, a borrower), not a supplier of financial capital on the right-hand side. However, if the government runs a budget surplus so that the taxes exceed spending, as the U.S. government did from 1998 to 2001, then the government in that year was contributing to the supply of financial capital ($T – G > 0$), and would appear on the left (saving) side of the national savings and investment identity.

Similarly, if a national economy runs a trade surplus, the trade sector will involve an outflow of financial capital to other countries. A trade surplus means that the domestic financial capital is in surplus within a country and can be invested in other countries.

The fundamental notion that total quantity of financial capital demanded equals total quantity of financial capital supplied must always remain true. Domestic savings will always appear as part of the supply of financial capital and domestic investment will always appear as part of the demand for financial capital. However, the government and trade balance elements of the equation can move back and forth as either suppliers or demanders of financial capital, depending on whether government budgets and the trade balance are in surplus or deficit.

Domestic Saving and Investment Determine the Trade Balance

One insight from the national saving and investment identity is that a nation's own levels of domestic saving and investment determine a nation’s balance of trade. To understand this point, rearrange the identity to put the balance of trade all by itself on one side of the equation. Consider first the situation with a trade deficit, and then the situation with a trade surplus.

In the case of a trade deficit, the national saving and investment identity can be rewritten as:

Trade deficit = Domestic investment – Private domestic saving – Government (or public) savings(M – X) = I – S – (T – G)Trade deficit = Domestic investment – Private domestic saving – Government (or public) savings(M – X) = I – S – (T – G)

In this case, domestic investment is higher than domestic saving, including both private and government saving. The only way that domestic investment can exceed domestic saving is if capital is flowing into a country from abroad. After all, that extra financial capital for investment has to come from someplace.

Now consider a trade *surplus* from the standpoint of the national saving and investment identity:

Trade surplus = Private domestic saving + Public saving – Domestic investment(X – M) = S + (T – G) – ITrade surplus = Private domestic saving + Public saving – Domestic investment(X – M) = S + (T – G) – I

In this case, domestic savings (both private and public) is higher than domestic investment. That extra financial capital will be invested abroad.

This connection of domestic saving and investment to the trade balance explains why economists view the balance of trade as a fundamentally macroeconomic phenomenon. As the national saving and investment identity shows, the performance of certain sectors of an economy, like cars or steel, do not determine the trade balance. Further, whether the nation’s trade laws and regulations encourage free trade or protectionism also does not determine the trade balance (see Globalization and Protectionism).

Exploring Trade Balances One Factor at a Time

The national saving and investment identity also provides a framework for thinking about what will cause trade deficits to rise or fall. Begin with the version of the identity that has domestic savings and investment on the left and the trade deficit on the right:

Domestic investment – Private domestic savings – Public domestic savings = Trade deficitI – S – (T – G) = (M – X)Domestic investment – Private domestic savings – Public domestic savings = Trade deficitI – S – (T – G) = (M – X)

Now, consider the factors on the left-hand side of the equation one at a time, while holding the other factors constant.

As a first example, assume that the level of domestic investment in a country rises, while the level of private and public saving remains unchanged. Table 10.6 shows the result in the first row under the equation. Since the equality of the national savings and investment identity must continue to hold—it is, after all, an identity that must be true by definition—the rise in domestic investment will mean a higher trade deficit. This situation occurred in the U.S. economy in the late 1990s. Because of the surge of new information and communications technologies that became available, business investment increased substantially. A fall in private saving during this time and a rise in government saving more or less offset each other. As a result, the financial capital to fund that business investment came from abroad, which is one reason for the very high U.S. trade deficits of the late 1990s and early 2000s.

Domestic Investment	–	Private Domestic Savings	–	Public Domestic Savings	=	Trade Deficit
I	**–**	**S**	**–**	**(T – G)**	=	**(M – X)**
Up		No change		No change		Then M – X must rise
No change		Up		No change		Then M – X must fall
No change		No change		Down		Then M – X must rise

Table 10.6 Causes of a Changing Trade Balance

As a second scenario, assume that the level of domestic savings rises, while the level of domestic investment and public savings remain unchanged. In this case, the trade deficit would decline. As domestic savings rises, there would be less need for foreign financial capital to meet investment needs. For this reason, a policy proposal often made for reducing the U.S. trade deficit is to increase private saving—although exactly how to increase the overall rate of saving has proven controversial.

As a third scenario, imagine that the government budget deficit increased dramatically, while domestic investment and private savings remained unchanged. This scenario occurred in the U.S. economy in the mid-1980s. The federal budget deficit increased from $79 billion in 1981 to $221 billion in 1986—an increase in the demand for financial capital of $142 billion. The current account balance collapsed from a surplus of $5 billion in 1981 to a deficit of $147 billion in 1986—an increase in the supply of financial capital from abroad of $152 billion. The connection at that time is clear: a sharp increase in government borrowing increased the U.S. economy's demand for financial capital, and foreign investors through the trade deficit primarily supplied that increase. The following Work It Out feature walks you through a scenario in which private domestic savings has to rise by a certain amount to reduce a trade deficit.

Work It Out

Solving Problems with the Saving and Investment Identity

Use the saving and investment identity to answer the following question: Country A has a trade deficit of $200 billion, private domestic savings of $500 billion, a government deficit of $200 billion, and private domestic investment of $500 billion. To reduce the $200 billion trade deficit by $100 billion, by how much does private domestic savings have to increase?

Step 1. Write out the savings investment formula solving for the trade deficit or surplus on the left:

$(X – M) = S + (T – G) – I(X – M) = S + (T – G) – I$

Step 2. In the formula, put the amount for the trade deficit in as a negative number (X – M). The left side of your formula is now:

$–200 = S + (T – G) – I–200 = S + (T – G) – I$

Step 3. Enter the private domestic savings (S) of $500 in the formula:

$–200 = 500 + (T – G) – I –200 = 500 + (T – G) – I$

Step 4. Enter the private domestic investment (I) of $500 into the formula:

$–200 = 500 + (T – G) – 500 –200 = 500 + (T – G) – 500$

Step 5. The government budget surplus or balance is represented by (T – G). Enter a budget deficit amount for (T – G) of –200:

$–200 = 500 + (–200) – 500 –200 = 500 + (–200) – 500$

Step 6. Your formula now is:

$(X – M) = S + (T – G) – I–200 = 500 + (–200) – 500(X – M) = S + (T – G) – I–200 = 500 + (–200) – 500$

The question is: To reduce your trade deficit (X – M) of –200 to –100 (in billions of dollars), by how much will savings have to rise?

(X – M) = S + (T – G) – I–100 = S + (–200) – 500600 = S(X – M) = S + (T – G) – I–100 = S + (–200) – 500600 = S

Step 7. Summarize the answer: Private domestic savings needs to rise by $100 billion, to a total of $600 billion, for the two sides of the equation to remain equal (–100 = –100).

Short-Term Movements in the Business Cycle and the Trade Balance

In the short run, whether an economy is in a recession or on the upswing can affect trade imbalances. A recession tends to make a trade deficit smaller, or a trade surplus larger, while a period of strong economic growth tends to make a trade deficit larger, or a trade surplus smaller. These are not hard-and-fast rules, however.

As an example, note in Figure 10.2 that the U.S. trade deficit declined by almost half from 2006 to 2009. One primary reason for this change is that during the recession, as the U.S. economy slowed down, it purchased fewer of all goods, including fewer imports from abroad. However, buying power abroad fell less, and so U.S. exports did not fall by as much. On the other hand, during the 2020 pandemic-induced recession, the trade deficit expanded (current account balance plummeted) as the U.S. economy became more reliant on other countries for goods and services.

Conversely, in the mid-2000s, when the U.S. trade deficit became very large, a contributing short-term reason is that the U.S. economy was growing. As a result, there was considerable aggressive buying in the U.S. economy, including the buying of imports. Thus, a trade deficit (or a much lower trade surplus) often accompanies a rapidly growing domestic economy, while a trade surplus (or a much lower trade deficit) accompanies a slowing or recessionary domestic economy.

Regardless of whether the trade deficit falls or rises during expansions or downturns, when the trade deficit rises, it necessarily means a greater net inflow of foreign financial capital. The national saving and investment identity teaches that the rest of the economy can absorb this inflow of foreign financial capital in several different ways. For example, reduced private savings could offset the additional inflow of financial capital from abroad, leaving domestic investment and public saving unchanged. Alternatively, the inflow of foreign financial capital could result in higher domestic investment, leaving private and public saving unchanged. Yet another possibility is that greater government borrowing could absorb the inflow of foreign financial capital, leaving domestic saving and investment unchanged. The national saving and investment identity does not specify which of these scenarios, alone or in combination, will occur—only that one of them must occur.

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4.6: The Pros and Cons of Trade Deficits and Surpluses

Learning Objectives

By the end of this section, you will be able to:

- Identify three ways in which borrowing money or running a trade deficit can result in a healthy economy
- Identify three ways in which borrowing money or running a trade deficit can result in a weaker economy

Because flows of trade always involve flows of financial payments, flows of international trade are actually the same as flows of international financial capital. The question of whether trade deficits or surpluses are good or bad for an economy is, in economic terms, exactly the same question as whether it is a good idea for an economy to rely on net inflows of financial capital from abroad or to make net investments of financial capital abroad. Conventional wisdom often holds that borrowing money is foolhardy, and that a prudent country, like a prudent person, should always rely on its own resources. While it is certainly possible to borrow too much—as anyone with an overloaded credit card can testify—borrowing at certain times can also make sound economic sense. For both individuals and countries, there is no economic merit in a policy of abstaining from participation in financial capital markets.

It makes economic sense to borrow when you are buying something with a long-run payoff; that is, when you are making an investment. For this reason, it can make economic sense to borrow for a college education, because the education will typically allow you to earn higher wages, and so to repay the loan and still come out ahead. It can also make sense for a business to borrow in order to purchase a machine that will last 10 years, as long as the machine will increase output and profits by more than enough to repay the loan. Similarly, it can make economic sense for a national economy to borrow from abroad, as long as it wisely invests the money in ways that will tend to raise the nation's economic growth over time. Then, it will be possible for the national economy to repay the borrowed money over time and still end up better off than before.

One vivid example of a country that borrowed heavily from abroad, invested wisely, and did perfectly well is the United States during the nineteenth century. The United States ran a trade deficit in 40 of the 45 years from 1831 to 1875, which meant that it was importing capital from abroad over that time. However, that financial capital was mostly invested in projects like railroads that brought a substantial economic payoff. (See the following Clear It Up feature for more on this.)

A more recent example along these lines is the experience of South Korea, which had trade deficits during much of the 1970s—and so was an importer of capital over that time. However, South Korea also had high rates of investment in physical plant and equipment, and its economy grew rapidly. From the mid-1980s into the mid-1990s, South Korea often had trade surpluses—that is, it was repaying its past borrowing by sending capital abroad.

In contrast, some countries have run large trade deficits, borrowed heavily in global capital markets, and ended up in all kinds of trouble. Two specific sorts of trouble are worth examining. First, a borrower nation can find itself in a bind if it does not invest the incoming funds from abroad in a way that leads to increased productivity. Several of Latin America's large economies, including Mexico and Brazil, ran large trade deficits and borrowed heavily from abroad in the 1970s, but the inflow of financial capital did not boost productivity sufficiently, which meant that these countries faced enormous troubles repaying the money borrowed when economic conditions shifted during the 1980s. Similarly, it appears that a number of African nations that borrowed foreign funds in the 1970s and 1980s did not invest in productive economic assets. As a result, several of those countries later faced large interest payments, with no economic growth to show for the borrowed funds.

Clear It Up

Are trade deficits always harmful?

For most years of the nineteenth century, U.S. imports exceeded exports and the U.S. economy had a trade deficit. Yet the string of trade deficits did not hold back the economy at all. Instead, the trade deficits contributed to the strong economic growth that gave the U.S. economy the highest per capita GDP in the world by around 1900.

The U.S. trade deficits meant that the U.S. economy was receiving a net inflow of foreign capital from abroad. Much of that foreign capital flowed into two areas of investment—railroads and public infrastructure like roads, water systems, and schools—which were important to helping the U.S. economy grow.

We should not overstate the effect of foreign investment capital on U.S. economic growth. In most years the foreign financial capital represented no more than 6–10% of the funds that the government used for overall physical investment in the economy. Nonetheless, the trade deficit and the accompanying investment funds from abroad were clearly a help, not a hindrance, to the U.S. economy in the nineteenth century.

A second “trouble” is: What happens if the foreign money flows in, and then suddenly flows out again? We raised this scenario at the start of the chapter. In the mid-1990s, a number of countries in East Asia—Thailand, Indonesia, Malaysia, and South Korea—ran large trade deficits and imported capital from abroad. However, in 1997 and 1998 many foreign investors became concerned about the health of these economies, and quickly pulled their money out of stock and bond markets, real estate, and banks. The extremely rapid departure of that foreign capital staggered the banking systems and economies of these countries, plunging them into deep recession. We investigate and discuss the links between international capital flows, banks, and recession in The Impacts of Government Borrowing.

While a trade deficit is not always harmful, there is no guarantee that running a trade surplus will bring robust economic health. For example, Germany and Japan ran substantial trade surpluses for most of the last three decades. Regardless of their persistent trade surpluses, both countries have experienced occasional recessions and neither country has had especially robust annual growth in recent years. Read more about Japan’s trade surplus in the next Clear It Up feature.

Link It Up

Watch this video on whether or not trade deficit is good for the economy.

The sheer size and persistence of the U.S. trade deficits and inflows of foreign capital since the 1980s are a legitimate cause for concern. The huge U.S. economy will not be destabilized by an outflow of international capital as easily as, say, the comparatively tiny economies of Thailand and Indonesia were in 1997–1998. Even an economy that is not knocked down, however, can still be shaken. American policymakers should certainly be paying attention to those cases where a pattern of extensive and sustained current account deficits and foreign borrowing has gone badly—if only as a cautionary tale.

Clear It Up

Are trade surpluses always beneficial? Considering Japan since the 1990s.

Perhaps no economy around the world is better known for its trade surpluses than Japan. Since 1990, the size of these surpluses has often been near $100 billion per year. When Japan’s economy was growing vigorously in the 1960s and 1970s, many, especially non-economists, described its large trade surpluses either a cause or a result of its robust economic health. However, from a standpoint of economic growth, Japan’s economy has been teetering in and out of recession since 1990, with real GDP growth averaging only about 1% per year, and an unemployment rate that has been creeping higher. Clearly, a whopping trade surplus is no guarantee of economic good health.

Instead, Japan’s trade surplus reflects that Japan has a very high rate of domestic savings, more than the Japanese economy can invest domestically, and so it invests the extra funds abroad. In Japan’s slow economy, consumption of imports is relatively low, and the growth of consumption is relatively slow. Thus, Japan’s exports continually exceed its imports, leaving the trade surplus continually high. Recently, Japan’s trade surpluses began to deteriorate. In 2013, Japan ran a trade deficit due to the high cost of imported oil. By 2015, Japan again had a surplus and continues to run one today.

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4.7: The Difference between Level of Trade and the Trade Balance

Learning Objectives

By the end of this section, you will be able to:

- Identify three factors that influence a country's level of trade
- Differentiate between balance of trade and level of trade

A nation’s *level* of trade may at first sound like much the same issue as the *balance* of trade, but these two are actually quite separate. It is perfectly possible for a country to have a very high level of trade—measured by its exports of goods and services as a share of its GDP—while it also has a near-balance between exports and imports. A high level of trade indicates that the nation exports a good portion of its production. It is also possible for a country’s trade to be a relatively low share of GDP, relative to global averages, but for the imbalance between its exports and its imports to be quite large. We emphasized this general theme earlier in Measuring Trade Balances, which offered some illustrative figures on trade levels and balances.

A country’s level of trade tells how much of its production it exports. We measure this by the percent of exports out of GDP. It indicates the degree of an economy's globalization. Some countries, such as Germany, have a high level of trade—they export almost 50% of their total production. The balance of trade tells us if the country is running a trade surplus or trade deficit. A country can have a low level of trade but a high trade deficit. (For example, the United States only exports around 10% of its GDP, but it has a trade deficit of over $600 billion.)

Three factors strongly influence a nation’s level of trade: the size of its economy, its geographic location, and its history of trade. Large economies like the United States can do much of their trading internally, while small economies like Sweden have less ability to provide what they want internally and tend to have higher ratios of exports and imports to GDP. Nations that are neighbors tend to trade more, since costs of transportation and communication are lower. Moreover, some nations have long and established patterns of international trade, while others do not.

Consequently, a relatively small economy like Sweden, with many nearby trading partners across Europe and a long history of foreign trade, has a high level of trade. Brazil and India, which are fairly large economies that have often sought to inhibit trade in recent decades, have lower levels of trade; whereas, the United States and Japan are extremely large economies that have comparatively few nearby trading partners. Both countries actually have quite low levels of trade by world standards. The ratio of exports to GDP in either the United States or in Japan is about half of the world average.

The balance of trade is a separate issue from the level of trade. The United States has a low level of trade, but had enormous trade deficits for most years from the mid-1980s into the 2000s. Japan has a low level of trade by world standards, but has typically shown large trade surpluses in recent decades. Nations like Germany and the United Kingdom have medium to high levels of trade by world standards, but Germany had a moderate trade surplus in 2020, while the United Kingdom had a moderate trade deficit. Their trade picture was roughly in balance in the late 1990s. Sweden had a high level of trade and a moderate trade surplus in 2020, while Canada had a high level of trade and a moderate trade deficit that same year.

In short, it is quite possible for nations with a relatively low level of trade, expressed as a percentage of GDP, to have relatively large trade deficits. It is also quite possible for nations with a near balance between exports and imports to worry about the consequences of high levels of trade for the economy. It is not inconsistent to believe that a high level of trade is potentially beneficial to an economy, because of the way it allows nations to play to their comparative advantages, and to also be concerned about any macroeconomic instability caused by a long-term pattern of large trade deficits. The following Clear It Up feature discusses how this sort of dynamic played out in Colonial India.

Clear It Up

Are trade surpluses always beneficial? Considering Colonial India.

India was formally under British rule from 1858 to 1947. During that time, India consistently had trade surpluses with Great Britain. Anyone who believes that trade surpluses are a sign of economic strength and dominance while trade deficits are a sign

of economic weakness must find this pattern odd, since it would mean that colonial India was successfully dominating and exploiting Great Britain for almost a century—which was not true.

Instead, India's trade surpluses with Great Britain meant that each year there was an overall flow of financial capital from India to Great Britain. In India, many heavily criticized this financial capital flow as the "drain," and they viewed eliminating the financial capital drain as one of the many reasons why India would benefit from achieving independence.

Final Thoughts about Trade Balances

Trade deficits can be a good or a bad sign for an economy, and trade surpluses can be a good or a bad sign. Even a trade balance of zero—which just means that a nation is neither a net borrower nor lender in the international economy—can be either a good or bad sign. The fundamental economic question is not whether a nation's economy is borrowing or lending at all, but whether the particular borrowing or lending in the particular economic conditions of that country makes sense.

It is interesting to reflect on how public attitudes toward trade deficits and surpluses might change if we could somehow change the labels that people and the news media affix to them. If we called a trade deficit "attracting foreign financial capital"—which accurately describes what a trade deficit means—then trade deficits might look more attractive. Conversely, if we called a trade surplus "shipping financial capital abroad"—which accurately captures what a trade surplus does—then trade surpluses might look less attractive. Either way, the key to understanding trade balances is to understand the relationships between flows of trade and flows of international payments, and what these relationships imply about the causes, benefits, and risks of different kinds of trade balances. The first step along this journey of understanding is to move beyond knee-jerk reactions to terms like "trade surplus," "trade balance," and "trade deficit."

Bring It Home

More than Meets the Eye in the Congo

Now that you see the big picture, you undoubtedly realize that all of the economic choices you make, such as depositing savings or investing in an international mutual fund, do influence the flow of goods and services as well as the flows of money around the world.

You now know that a trade surplus does not necessarily tell us whether an economy is performing well or not. The Democratic Republic of the Congo ran a trade surplus in 2013, as we learned in the beginning of the chapter. Yet its current account balance was –$2.8 billion. However, the return of political stability and the rebuilding in the aftermath of the civil war there has meant a flow of investment and financial capital into the country. In this case, a negative current account balance means the country is being rebuilt—and that is a good thing.

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4.8: Key Terms

balance of trade (trade balance)
the gap, if any, between a nation’s exports and imports

current account balance
a broad measure of the balance of trade that includes trade in goods and services, as well as international flows of income and foreign aid

exports of goods and services as a percentage of GDP
the dollar value of exports divided by the dollar value of a country’s GDP

financial capital
the international flows of money that facilitates trade and investment

merchandise trade balance
the balance of trade looking only at goods

national savings and investment identity
the total of private savings and public savings (a government budget surplus)

unilateral transfers
“one-way payments” that governments, private entities, or individuals make that they sent abroad with nothing received in return

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4.9: Key Concepts and Summary

10.1 Measuring Trade Balances

The trade balance measures the gap between a country's exports and its imports. In most high-income economies, goods comprise less than half of a country's total production, while services comprise more than half. The last two decades have seen a surge in international trade in services; however, most global trade still takes the form of goods rather than services. The current account balance includes the trade in goods, services, and money flowing into and out of a country from investments and unilateral transfers.

10.2 Trade Balances in Historical and International Context

The United States developed large trade surpluses in the early 1980s, swung back to a tiny trade surplus in 1991, and then had even larger trade deficits in the late 1990s and early 2000s. As we will see below, a trade deficit necessarily means a net inflow of financial capital from abroad, while a trade surplus necessarily means a net outflow of financial capital from an economy to other countries.

10.3 Trade Balances and Flows of Financial Capital

International flows of goods and services are closely connected to the international flows of financial capital. A current account deficit means that, after taking all the flows of payments from goods, services, and income together, the country is a net borrower from the rest of the world. A current account surplus is the opposite and means the country is a net lender to the rest of the world.

10.4 The National Saving and Investment Identity

The national saving and investment identity is based on the relationship that the total quantity of financial capital supplied from all sources must equal the total quantity of financial capital demanded from all sources. If S is private saving, T is taxes, G is government spending, M is imports, X is exports, and I is investment, then for an economy with a current account deficit and a budget deficit:

Supply of financial capital = Demand for financial capitalS + (M – X)=I + (G – T) Supply of financial capital = Demand for financial capitalS + (M – X)=I + (G – T)

A recession tends to increase the trade balance (meaning a higher trade surplus or lower trade deficit), while economic boom will tend to decrease the trade balance (meaning a lower trade surplus or a larger trade deficit).

10.5 The Pros and Cons of Trade Deficits and Surpluses

Trade surpluses are no guarantee of economic health, and trade deficits are no guarantee of economic weakness. Either trade deficits or trade surpluses can work out well or poorly, depending on whether a government wisely invests the corresponding flows of financial capital.

10.6 The Difference between Level of Trade and the Trade Balance

There is a difference between the level of a country's trade and the balance of trade. The government measures its level of trade by the percentage of exports out of GDP, or the size of the economy. Small economies that have nearby trading partners and a history of international trade will tend to have higher levels of trade. Larger economies with few nearby trading partners and a limited history of international trade will tend to have lower levels of trade. The level of trade is different from the trade balance. The level of trade depends on a country's history of trade, its geography, and the size of its economy. A country's balance of trade is the dollar difference between its exports and imports.

Trade deficits and trade surpluses are not necessarily good or bad—it depends on the circumstances. Even if a country is borrowing, if it invests that money in productivity-boosting investments it can lead to an improvement in long-term economic growth.

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CHAPTER OVERVIEW

5: Labor and Financial Markets

Chapter Objectives

In this chapter, you will learn about:

- Demand and Supply at Work in Labor Markets
- Demand and Supply in Financial Markets
- The Market System as an Efficient Mechanism for Information

5.1: Introduction to Labor and Financial Markets

5.2: Demand and Supply at Work in Labor Markets

5.3: Demand and Supply in Financial Markets

5.4: The Market System as an Efficient Mechanism for Information

5.5: Key Terms

5.6: Key Concepts and Summary

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5.1: Introduction to Labor and Financial Markets



Figure 4.1 People often think of demand and supply in relation to goods, but labor markets, such as the nursing profession, can also apply to this analysis. (Credit: modification of "Hospital do Subúrbio" by Jaques Wagner Governador/Flickr Creative Commons, CC BY 2.0)

Bring It Home

Baby Boomers Come of Age

According to the 2020 Census, 22% of the U.S. population was 60 years old or older, which means that more than 74 million people have reached an age when they will need increased medical care.

The baby boomer population, the group born between 1946 and 1964, is comprised of more than 71 million people who have already reached retirement age or will soon reach retirement. As this population grows older, they will be faced with common healthcare issues such as heart conditions, arthritis, and Alzheimer's that may require hospitalization, long-term, or at-home nursing care. Aging baby boomers and advances in life-saving and life-extending technologies will increase the demand for healthcare and nursing. Additionally, the Affordable Care Act, which expands access to healthcare for millions of Americans, has further increased the demand.

These data tell us, as economists, that the market for healthcare professionals, and nurses in particular, will face several challenges. Our study of supply and demand will help us to analyze what might happen in the labor market for nursing and other healthcare professionals, as we will discuss in the second half of this case at the end of the chapter.

The theories of supply and demand do not apply just to markets for goods. They apply to any market, even markets for things we may not think of as goods and services like labor and financial services. Labor markets are markets for employees or jobs. Financial services 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 the demanders and suppliers: 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. In financial markets, any individual or firm who saves contributes to the supply of money, and any entity that 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: According to the National Center for Educational Statistics, in 2018 43% of full-time college students and 81% of part-time college students were employed. Most college students are also heavily involved in financial markets, primarily as borrowers. As of the 2018–19 school year, 43% of full-time undergraduate students were receiving loan aid to help finance their education,

and those loans averaged $7,300 per year. Many students also borrow for other expenses, like purchasing a car. As this chapter will illustrate, we can analyze labor markets and financial markets with the same tools we use to analyze demand and supply in the goods markets.

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5.2: Demand and Supply at Work in Labor Markets

Learning Objectives

By the end of this section, you will be able to:

- Predict shifts in the demand and supply curves of the labor market
- Explain the impact of new technology on the demand and supply curves of the labor market
- Explain price floors in the labor market such as minimum wage or a living wage

Markets for labor have demand and supply curves, just like markets for goods. The law of demand applies in labor markets this way: A higher salary or wage—that is, a higher price in the labor market—leads to a decrease in the quantity of labor demanded by employers, while a lower salary or wage leads to an increase in the quantity of labor demanded. The law of supply functions in labor markets, too: A higher price for labor leads to a higher quantity of labor supplied; a lower price leads to a lower quantity supplied.

Equilibrium in the Labor Market

In 2020, nearly 41,000 registered nurses worked in the Minneapolis-St. Paul-Bloomington, Minnesota-Wisconsin metropolitan area, according to the BLS. They worked for a variety of employers: hospitals, doctors' offices, schools, health clinics, and nursing homes. Figure 4.2 illustrates how demand and supply determine equilibrium in this labor market. The demand and supply schedules in Table 4.1 list the quantity supplied and quantity demanded of nurses at different salaries.

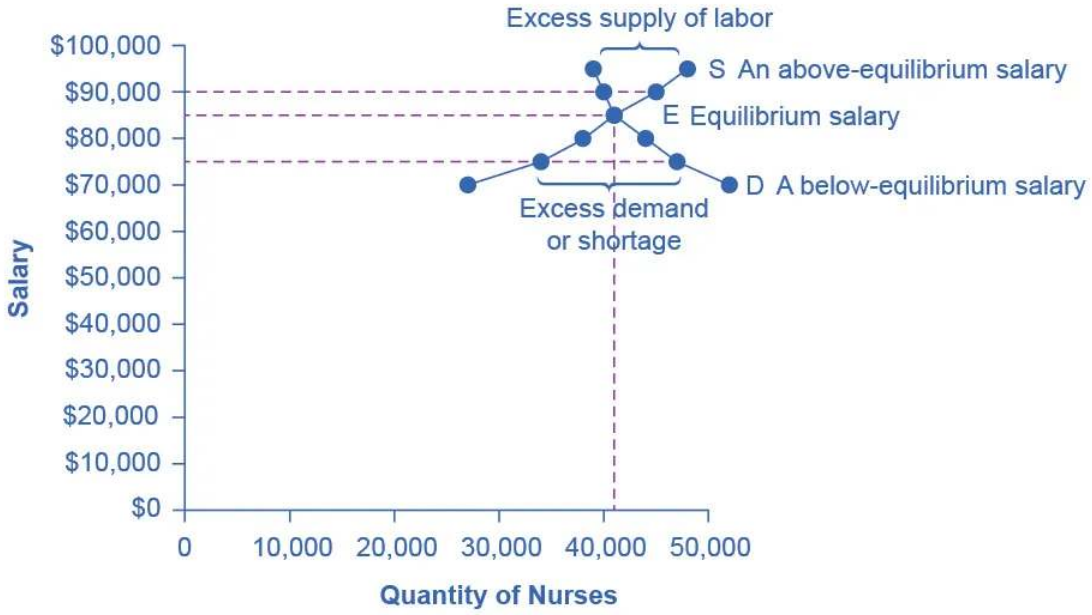


Figure 4.2 Labor Market Example: Demand and Supply for Nurses in Minneapolis-St. Paul-Bloomington The demand curve (D) of those employers who want to hire nurses intersects with the supply curve (S) of those who are qualified and willing to work as nurses at the equilibrium point (E). The equilibrium salary is $85,000 and the equilibrium quantity is 41,000 nurses. At an above-equilibrium salary of $90,000, quantity supplied increases to 45,000, but the quantity of nurses demanded at the higher pay declines to 40,000. At this above-equilibrium salary, an excess supply or surplus of nurses would exist. At a below-equilibrium salary of $75,000, quantity supplied declines to 34,000, while the quantity demanded at the lower wage increases to 47,000 nurses. At this below-equilibrium salary, excess demand or a shortage exists.

Annual Salary	Quantity Demanded	Quantity Supplied
$70,000	52,000	27,000
$75,000	47,000	34,000
$80,000	44,000	38,000
$85,000	41,000	41,000
$90,000	40,000	45,000
$95,000	39,000	48,000

Table 4.1 Demand and Supply of Nurses in Minneapolis-St. Paul-Bloomington

The horizontal axis shows the quantity of nurses hired. In this example we measure labor by number of workers, but another common way to measure the quantity of labor is by the number of hours worked. The vertical axis shows the price for nurses' labor—that is, how much they are paid. In the real world, this "price" would be total labor compensation: salary plus benefits. It is not obvious, but benefits are a significant part (as high as 30 percent) of labor compensation. In this example we measure the price of labor by salary on an annual basis, although in other cases we could measure the price of labor by monthly or weekly pay, or even the wage paid per hour. As the salary for nurses rises, the quantity demanded will fall. Some hospitals and nursing homes may reduce the number of nurses they hire, or they may lay off some of their existing nurses, rather than pay them higher salaries. Employers who face higher nurses' salaries may also try to replace some nursing functions by investing in physical equipment, like computer monitoring and diagnostic systems to monitor patients, or by using lower-paid health care aides to reduce the number of nurses they need.

As the salary for nurses rises, the quantity supplied will rise. If nurses' salaries in Minneapolis-St. Paul-Bloomington are higher than in other cities, more nurses will move to Minneapolis-St. Paul-Bloomington to find jobs, more people will be willing to train as nurses, and those currently trained as nurses will be more likely to pursue nursing as a full-time job. In other words, there will be more nurses looking for jobs in the area.

At equilibrium, the quantity supplied and the quantity demanded are equal. Thus, every employer who wants to hire a nurse at this equilibrium wage can find a willing worker, and every nurse who wants to work at this equilibrium salary can find a job. In Figure 4.2, the supply curve (S) and demand curve (D) intersect at the equilibrium point (E). The equilibrium quantity of nurses in the Minneapolis-St. Paul-Bloomington area is 41,000, and the equilibrium salary is $86,000 per year. This example simplifies the nursing market by focusing on the "average" nurse. In reality, of course, the market for nurses actually comprises many smaller markets, like markets for nurses with varying degrees of experience and credentials. Many markets contain closely related products that differ in quality. For instance, even a simple product like gasoline comes in regular, premium, and super-premium, each with a different price. Even in such cases, discussing the average price of gasoline, like the average salary for nurses, can still be useful because it reflects what is happening in most of the submarkets.

When the price of labor is not at the equilibrium, economic incentives tend to move salaries toward the equilibrium. For example, if salaries for nurses in Minneapolis-St. Paul-Bloomington were above the equilibrium at $90,000 per year, then 43,000 people want to work as nurses, but employers want to hire only 39,000 nurses. At that above-equilibrium salary, excess supply or a surplus results. In a situation of excess supply in the labor market, with many applicants for every job opening, employers will have an incentive to offer lower wages than they otherwise would have. Nurses' salary will move down toward equilibrium.

In contrast, if the salary is below the equilibrium at, say, $60,000 per year, then a situation of excess demand or a shortage arises. In this case, employers encouraged by the relatively lower wage want to hire 40,000 nurses, but only 27,000 individuals want to work as nurses at that salary in Minneapolis-St. Paul-Bloomington. In response to the shortage, some employers will offer higher pay to attract the nurses. Other employers will have to match the higher pay to keep their own employees. The higher salaries will encourage more nurses to train or work in Minneapolis-St. Paul-Bloomington. Again, price and quantity in the labor market will move toward equilibrium.

Shifts in Labor Demand

The demand curve for labor shows the quantity of labor employers wish to hire at any given salary or wage rate, under the *ceteris paribus* assumption. A change in the wage or salary will result in a change in the quantity demanded of labor. If the wage rate increases, employers will want to hire fewer employees. The quantity of labor demanded will decrease, and there will be a movement upward along the demand curve. If the wages and salaries decrease, employers are more likely to hire a greater number of workers. The quantity of labor demanded will increase, resulting in a downward movement along the demand curve.

Shifts in the demand curve for labor occur for many reasons. One key reason is that the demand for labor is based on the demand for the good or service that is produced. For example, the more new automobiles consumers demand, the greater the number of workers automakers will need to hire. Therefore the demand for labor is called a "derived demand." Here are some examples of derived demand for labor:

- The demand for chefs is dependent on the demand for restaurant meals.
- The demand for pharmacists is dependent on the demand for prescription drugs.
- The demand for attorneys is dependent on the demand for legal services.

As the demand for the goods and services increases, the demand for labor will increase, or shift to the right, to meet employers' production requirements. As the demand for the goods and services decreases, the demand for labor will decrease, or shift to the left. Table 4.2 shows that in addition to the derived demand for labor, demand can also increase or decrease (shift) in response to several factors.

Factors	Results
Demand for Output	When the demand for the good produced (output) increases, both the output price and profitability increase. As a result, producers demand more labor to ramp up production.
Education and Training	A well-trained and educated workforce causes an increase in the demand for that labor by employers. Increased levels of productivity within the workforce will cause the demand for labor to shift to the right. If the workforce is not well-trained or educated, employers will not hire from within that labor pool, since they will need to spend a significant amount of time and money training that workforce. Demand for such will shift to the left.
Technology	Technology changes can act as either substitutes for or complements to labor. When technology acts as a substitute, it replaces the need for the number of workers an employer needs to hire. For example, word processing decreased the number of typists needed in the workplace. This shifted the demand curve for typists left. An increase in the availability of certain technologies may increase the demand for labor. Technology that acts as a complement to labor will increase the demand for certain types of labor, resulting in a rightward shift of the demand curve. For example, the increased use of word processing and other software has increased the demand for information technology professionals who can resolve software and hardware issues related to a firm's network. More and better technology will increase demand for skilled workers who know how to use technology to enhance workplace productivity. Those workers who do not adapt to changes in technology will experience a decrease in demand.
Number of Companies	An increase in the number of companies producing a given product will increase the demand for labor resulting in a shift to the right. A decrease in the number of companies producing a given product will decrease the demand for labor resulting in a shift to the left.
Government Regulations	Complying with government regulations can increase or decrease the demand for labor at any given wage. In the healthcare industry, government rules may require that nurses be hired to carry out certain medical procedures. This will increase the demand for nurses. Less-trained healthcare workers would be prohibited from carrying out these procedures, and the demand for these workers will shift to the left.
Price and Availability of Other Inputs	Labor is not the only input into the production process. For example, a salesperson at a call center needs a telephone and a computer terminal to enter data and record sales. If prices of other inputs fall, production will become more profitable and suppliers will demand more labor to increase production. This will cause a rightward shift in the demand curve for labor. The opposite is also true. Higher prices for other inputs lower demand for labor.

Table 4.2 Factors That Can Shift Demand

Link It Up

Click here to read more about "Trends and Challenges for Work in the 21st Century."

Shifts in Labor Supply

The supply of labor is upward-sloping and adheres to the law of supply: The higher the price, the greater the quantity supplied and the lower the price, the less quantity supplied. The supply curve models the tradeoff between supplying labor into the market or using time in leisure activities at every given price level. The higher the wage, the more labor is willing to work and forego leisure activities. Table 4.3 lists some of the factors that will cause the supply to increase or decrease.

Factors	Results
Number of Workers	An increased number of workers will cause the supply curve to shift to the right. An increased number of workers can be due to several factors, such as immigration, increasing population, an aging population, and changing demographics. Policies that encourage immigration will increase the supply of labor, and vice versa. Population grows when birth rates exceed death rates. This eventually increases supply of labor when the former reach working age. Another example of changing demographics is more women working outside of the home, which increases the supply of labor.
Required Education	The more required education, the lower the supply. There is a lower supply of PhD mathematicians than of high school mathematics teachers; there is a lower supply of cardiologists than of primary care physicians; and there is a lower supply of physicians than of nurses.
Government Policies	Government policies can also affect the supply of labor for jobs. Alternatively, the government may support rules that set high qualifications for certain jobs: academic training, certificates or licenses, or experience. When these qualifications are made tougher, the number of qualified workers will decrease at any given wage. On the other hand, the government may also subsidize training or even reduce the required level of qualifications. For example, government might offer subsidies for nursing schools or nursing students. Such provisions would shift the supply curve of nurses to the right. In addition, government policies that change the relative desirability of working versus not working also affect the labor supply. These include unemployment benefits, maternity leave, child care benefits, and welfare policy. For example, child care benefits may increase the labor supply of working mothers. Long term unemployment benefits may discourage job searching for unemployed workers. All these policies must therefore be carefully designed to minimize any negative labor supply effects.

Table 4.3 Factors that Can Shift Supply

A change in salary will lead to a movement along labor demand or labor supply curves, but it will not shift those curves. However, other events like those we have outlined here will cause either the demand or the supply of labor to shift, and thus will move the labor market to a new equilibrium salary and quantity.

Technology and Wage Inequality: The Four-Step Process

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 having the ability to monitor more information, communicate more easily, and juggle a wider array of responsibilities. How will the new technologies affect the wages of high-skill and low-skill workers? For this question, the four-step process of analyzing how shifts in supply or demand affect a market (introduced in Demand and Supply) works in this way:

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 4.3 (a) and Figure 4.3 (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.

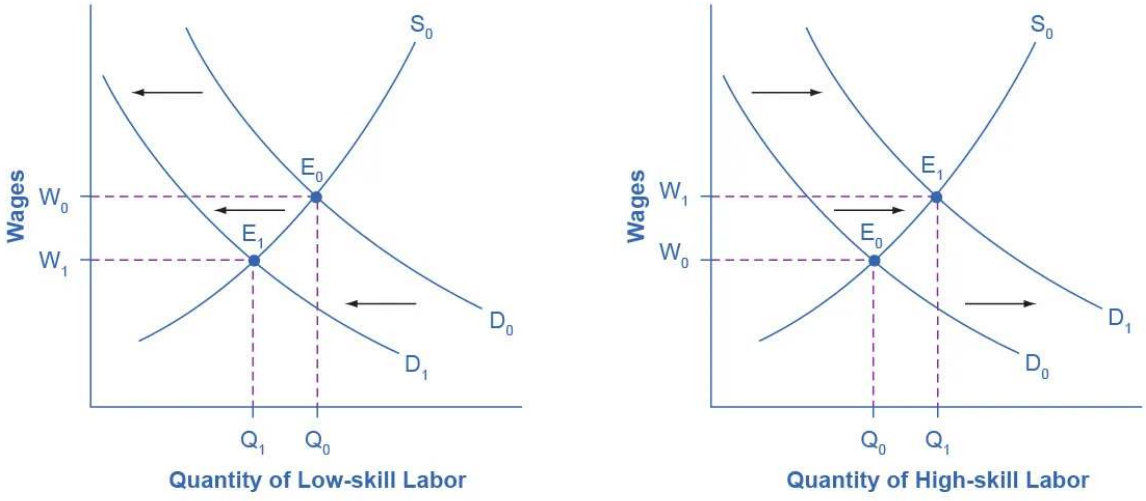


Figure 4.3 Technology and Wages: Applying Demand and Supply (a) The demand for low-skill labor shifts to the left when technology can do the job previously done by these workers. (b) New technologies can also increase the demand for high-skill labor in fields such as information technology and network administration.

Step 2. Does the new technology affect the supply of labor from households or the demand for labor from firms? The technology change described here affects demand for labor by firms that hire workers.

Step 3. Will the new technology increase or decrease demand? 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.

Step 4. 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).

Thus, 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. 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 2019, a college graduate earned about 59% more than an otherwise comparable high school graduate. Many economists believe that the trend toward greater wage inequality across the U.S. economy is due to improvements in technology.

Link It Up

> Visit this website to read about ten tech skills that have lost relevance in today's workforce.

Price Floors in the Labor Market: Living Wages and Minimum Wages

In contrast to goods and services markets, price ceilings are rare in labor markets, because rules that prevent people from earning income are not politically popular. There is one exception: boards of trustees or stockholders, as an example, propose limits on the high incomes of top business executives.

The labor market, however, presents some prominent examples of price floors, which are an attempt to increase the wages of low-paid workers. The U.S. government sets a minimum wage, a price floor that makes it illegal for an employer to pay employees less than a certain hourly rate. In mid-2009, the U.S. minimum wage was raised to $7.25 per hour. Local political movements in a number of U.S. cities have pushed for a higher minimum wage, which they call a living wage. Promoters of living wage laws maintain that the minimum wage is too low to ensure a reasonable standard of living. They base this conclusion on the calculation that, if you work 40 hours a week at a minimum wage of $7.25 per hour for 50 weeks a year, your annual income is $14,500, which is less than the official U.S. government definition of what it means for a family to be in poverty. (A family with two adults earning minimum wage and two young children will find it more cost efficient for one parent to provide childcare while the other works for income. Thus the family income would be $14,500, which is significantly lower than the federal poverty line for a family of four, which was $26,500 in 2021.)

Supporters of the living wage argue that full-time workers should be assured a high enough wage so that they can afford the essentials of life: food, clothing, shelter, and healthcare. Since Baltimore passed the first living wage law in 1994, several dozen cities enacted similar laws in the late 1990s and the 2000s. The living wage ordinances do not apply to all employers, but they have specified that all employees of the city or employees of firms that the city hires be paid at least a certain wage that is usually a few dollars per hour above the U.S. minimum wage.

Figure 4.4 illustrates the situation of a city considering a living wage law. For simplicity, we assume that there is no federal minimum wage. The wage appears on the vertical axis, because the wage is the price in the labor market. Before the passage of the living wage law, the equilibrium wage is $10 per hour and the city hires 1,200 workers at this wage. However, a group of concerned citizens persuades the city council to enact a living wage law requiring employers to pay no less than $12 per hour. In response to the higher wage, 1,600 workers look for jobs with the city. At this higher wage, the city, as an employer, is willing to hire only 700 workers. At the price floor, the quantity supplied exceeds the quantity demanded, and a surplus of labor exists in this market. For workers who continue to have a job at a higher salary, life has improved. For those who were willing to work at the old wage rate but lost their jobs with the wage increase, life has not improved. Table 4.4 shows the differences in supply and demand at different wages.

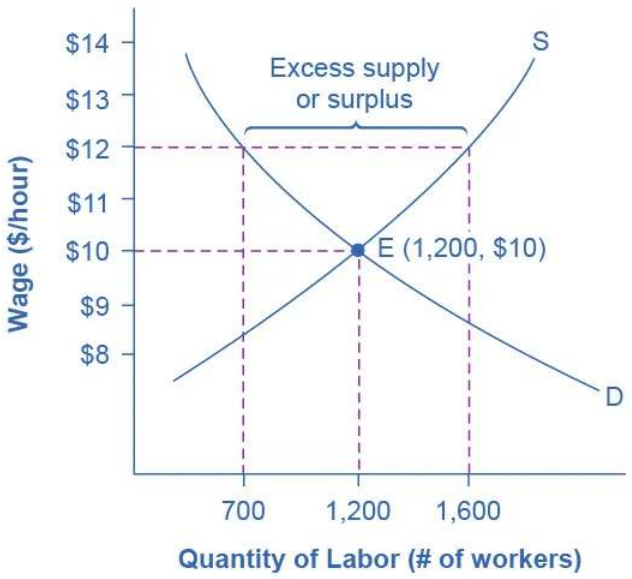


Figure 4.4 A Living Wage: Example of a Price Floor The original equilibrium in this labor market is a wage of $10/hour and a quantity of 1,200 workers, shown at point E. Imposing a wage floor at $12/hour leads to an excess supply of labor. At that wage, the quantity of labor supplied is 1,600 and the quantity of labor demanded is only 700.

Wage	Quantity Labor Demanded	Quantity Labor Supplied
$8/hr	1,900	500
$9/hr	1,500	900
$10/hr	1,200	1,200
$11/hr	900	1,400
$12/hr	700	1,600
$13/hr	500	1,800
$14/hr	400	1,900

Table 4.4 Living Wage: Example of a Price Floor

The Minimum Wage as an Example of a Price Floor

The U.S. minimum wage is a price floor that is set either very close to the equilibrium wage or even slightly below it. About 1.5% of hourly workers in the U.S. are paid the minimum wage. In other words, the vast majority of the U.S. labor force has its wages determined in the labor market, not as a result of the government price floor. However, for workers with low skills and little experience, like those without a high school diploma or teenagers, the minimum wage is quite important. In many cities, the federal minimum wage is apparently below the market price for unskilled labor, because employers offer more than the minimum wage to checkout clerks and other low-skill workers without any government prodding.

Economists have attempted to estimate how much the minimum wage reduces the quantity demanded of low-skill labor. A typical result of such studies is that a 10% increase in the minimum wage would decrease the hiring of unskilled workers by 1 to 2%, which seems a relatively small reduction. In fact, some studies have even found no effect of a higher minimum wage on employment at certain times and places—although these studies are controversial. Well-known economists Walter Williams and Thomas Sowell, who both focus on the intersections of race and economics, argue that minimum wages increase discrimination and limit economic mobility. Williams, for example, indicates that higher minimum wages would increase employment barriers for lower-skilled workers, reducing the opportunity for them to learn on the job and gain experience that would give them more choice in employment.

Let’s suppose that the minimum wage lies just slightly *below* the equilibrium wage level. Wages could fluctuate according to market forces above this price floor, but they would not be allowed to move beneath the floor. In this situation, the price floor minimum wage is *nonbinding* —that is, the price floor is not determining the market outcome. Even if the minimum wage moves just a little higher, it will still have no effect on the quantity of employment in the economy, as long as it remains below the equilibrium wage. Even if the government increases the minimum wage by enough so that it rises slightly above the equilibrium wage and becomes binding, there will be only a small excess supply gap between the quantity demanded and quantity supplied.

These insights help to explain why U.S. minimum wage laws have historically had only a small impact on employment. Since the minimum wage has typically been set close to the equilibrium wage for low-skill labor and sometimes even below it, it has not had a large effect in creating an excess supply of labor. However, if the minimum wage increased dramatically—say, if it doubled to match the living wages that some U.S. cities have considered—then its impact on reducing the quantity demanded of employment would be far greater. The following Clear It Up feature describes in greater detail some of the arguments for and against changes to the minimum wage.

Clear It Up

What's the harm in raising the minimum wage?

Because of the law of demand, a higher required wage will reduce the amount of low-skill employment either in terms of employees or in terms of work hours. Although there is controversy over the numbers, let's say for the sake of the argument that a 10% rise in the minimum wage will reduce the employment of low-skill workers by 2%. Does this outcome mean that raising the minimum wage by 10% is bad public policy? Not necessarily.

If 98% of those receiving the minimum wage have a pay increase of 10%, but 2% of those receiving the minimum wage lose their jobs, are the gains for society as a whole greater than the losses? The answer is not clear, because job losses, even for a small group, may cause more pain than modest income gains for others. For one thing, we need to consider which minimum wage workers are losing their jobs. If the 2% of minimum wage workers who lose their jobs are struggling to support families, that is one thing. If those who lose their job are high school students picking up spending money over summer vacation, that is something else.

Another complexity is that many minimum wage workers do not work full-time for an entire year. Imagine a minimum wage worker who holds different part-time jobs for a few months at a time, with bouts of unemployment in between. The worker in this situation receives the 10% raise in the minimum wage when working, but also ends up working 2% fewer hours during the year because the higher minimum wage reduces how much employers want people to work. Overall, this worker's income would rise because the 10% pay raise would more than offset the 2% fewer hours worked.

Of course, these arguments do not prove that raising the minimum wage is necessarily a good idea either. There may well be other, better public policy options for helping low-wage workers. (The Poverty and Economic Inequality chapter discusses some possibilities.) The lesson from this maze of minimum wage arguments is that complex social problems rarely have simple answers. Even those who agree on how a proposed economic policy affects quantity demanded and quantity supplied may still disagree on whether the policy is a good idea.

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5.3: Demand and Supply in Financial Markets

Learning Objectives

By the end of this section, you will be able to:

- Identify the demanders and suppliers in a financial market
- Explain how interest rates can affect supply and demand
- Analyze the economic effects of U.S. debt in terms of domestic financial markets
- Explain the role of price ceilings and usury laws in the U.S.

United States' households, institutions, and domestic businesses saved almost $1.3 trillion in 2015. Where did that savings go and how was it used? 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.

In this section, we will determine how the demand and supply model links those who wish to supply financial capital (i.e., savings) with those who demand financial capital (i.e., borrowing). 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. For a more detailed treatment of the different kinds of financial investments like bank accounts, stocks and bonds, see the Financial Markets chapter.

Who Demands and Who Supplies in Financial Markets?

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 a rate of return. This 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 the interest rate. For example, when you supply money into a savings account at a bank, you receive interest on your deposit. The interest the bank pays you 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 2021, 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 2021, Americans had about $807 billion outstanding in credit card debts. As of 2021, just over 45% of American families carried some credit card debt. 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 4.5 illustrates demand and supply in the financial market for credit cards. The horizontal axis of the financial market shows the quantity of money loaned or borrowed in this market. The vertical or price axis shows the rate of return, which in the case of credit card borrowing we can measure with an interest rate. Table 4.5 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.

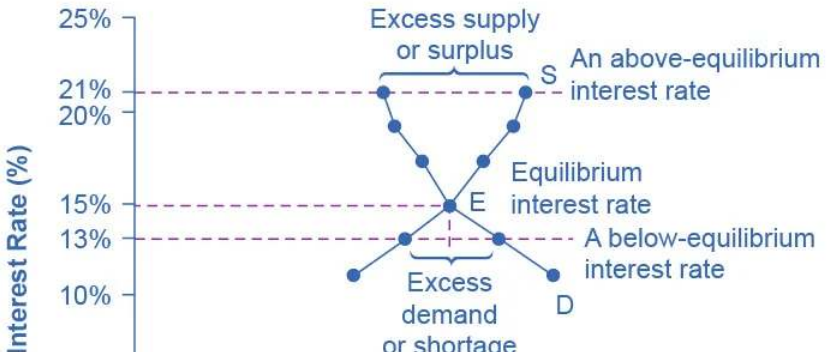
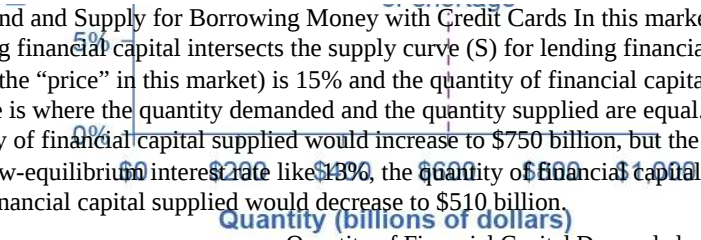


Figure 4.5 Demand and Supply for Borrowing Money with Credit Cards In this market for credit card borrowing, the demand curve (D) for borrowing financial capital intersects the supply curve (S) for lending financial capital at equilibrium E. At the equilibrium, the interest rate (the "price" in this market) is 15% and the quantity of financial capital 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.



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

Table 4.5 Demand and Supply for Borrowing Money with Credit Cards

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 increase.

Equilibrium in Financial Markets

In the financial market for credit cards in Figure 4.5, 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.

The FRED database publishes some two dozen measures of interest rates, including interest rates on credit cards, automobile loans, personal loans, mortgage loans, and more. You can find these at the FRED website.

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 investments. 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, people make investment or savings decisions 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. Thus, 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. Thus, 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 2008 and 2009 Great Recession, 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 becomes more risky, or the return diminishes, then savers will shift their funds to Investment B—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 Work It Out deals with one of the macroeconomic concerns for the U.S. economy in recent years.

Work It Out

The Effect of Growing U.S. Debt

Imagine that foreign investors viewed the U.S. economy as a less desirable place 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?

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 4.6 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.

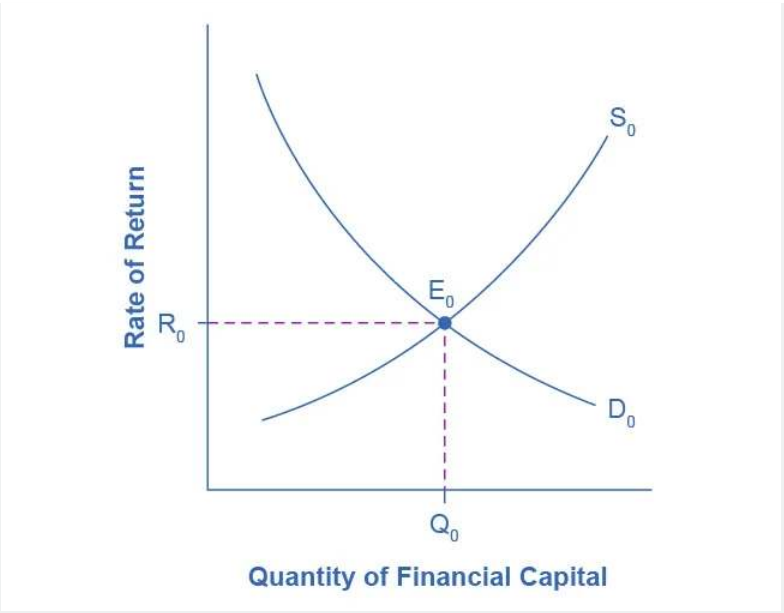


Figure 4.6 The United States as a Global Borrower Before U.S. Debt Uncertainty The graph shows the demand for financial capital from and supply of financial capital into the U.S. financial markets by the foreign sector before the increase in uncertainty regarding U.S. public debt. The original equilibrium (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? 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. Diminished confidence means U.S. financial assets will be seen as more risky.

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 4.7 shows the supply curve shift from S_0 to S_1.

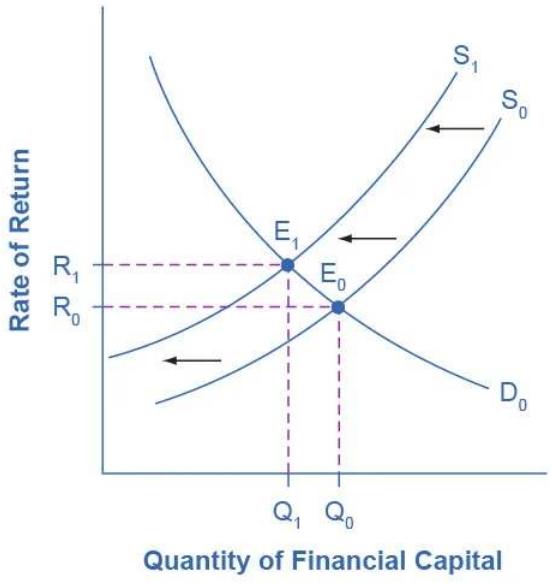


Figure 4.7 The United States as a Global Borrower Before and After U.S. Debt Uncertainty The graph shows the demand for financial capital and supply of financial capital into the U.S. financial markets by the foreign sector before and after the increase in uncertainty regarding U.S. public debt. The original equilibrium (E_0) occurs at an equilibrium rate of return (R_0) and the equilibrium quantity is at Q_0.

Step 4. Thus, 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. In short, U.S. borrowers will have to pay more interest on their borrowing.

The economy has experienced an enormous inflow of foreign capital. According to the U.S. Bureau of Economic Analysis, by the third quarter of 2021, U.S. investors had accumulated $34.45 trillion of foreign assets, but foreign investors owned a total of $50.53 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 we can analyze these flows of funds with the same tools of demand and supply as markets for goods or labor.

Price Ceilings in Financial Markets: Usury Laws

As we noted earlier, about 200 million Americans own credit cards, and their interest payments and fees total tens of billions of dollars each year. It is little wonder that political pressures sometimes arise for setting limits on the interest rates or fees that credit card companies charge. The firms that issue credit cards, including banks, oil companies, phone companies, and retail stores, respond that the higher interest rates are necessary to cover the losses created by those who borrow on their credit cards and who do not repay on time or at all. These companies also point out that cardholders can avoid paying interest if they pay their bills on time.

Consider the credit card market as Figure 4.8 illustrates. In this financial market, the vertical axis shows the interest rate (which is the price in the financial market). Demanders in the credit card market are households and businesses. Suppliers are the companies that issue credit cards. This figure does not use specific numbers, which would be hypothetical in any case, but instead focuses on the underlying economic relationships. Imagine a law imposes a price ceiling that holds the interest rate charged on credit cards at the rate Rc, which lies below the interest rate R_0 that would otherwise have prevailed in the market. The horizontal dashed line at interest rate R_c in Figure 4.8 shows the price ceiling. The demand and supply model predicts that at the lower price ceiling interest rate, the quantity demanded of credit card debt will increase from its original level of Q_0 to Qd; however, the quantity supplied of credit card debt will decrease from the original Q_0 to Qs. At the price ceiling (Rc), quantity demanded will exceed quantity supplied. Consequently, a number of people who want to have credit cards and are willing to pay the prevailing interest rate will find that companies are unwilling to issue cards to them. The result will be a credit shortage.

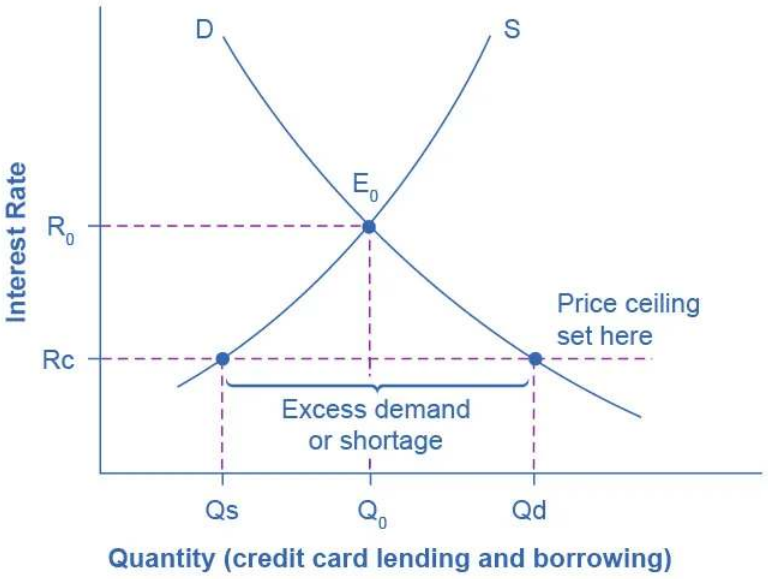


Figure 4.8 Credit Card Interest Rates: Another Price Ceiling Example The original intersection of demand D and supply S occurs at equilibrium E_0. However, a price ceiling is set at the interest rate Rc, below the equilibrium interest rate R_0, and so the interest rate cannot adjust upward to the equilibrium. At the price ceiling, the quantity demanded, Qd, exceeds the quantity supplied, Qs. There is excess demand, also called a shortage.

Many states do have usury laws, which impose an upper limit on the interest rate that lenders can charge. However, in many cases these upper limits are well above the market interest rate. For example, if the interest rate is not allowed to rise above 30% per year, it can still fluctuate below that level according to market forces. A price ceiling that is set at a relatively high level is nonbinding, and it will have no practical effect unless the equilibrium price soars high enough to exceed the price ceiling.

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5.4: The Market System as an Efficient Mechanism for Information

Learning Objectives

By the end of this section, you will be able to:

- Apply demand and supply models to analyze prices and quantities
- Explain the effects of price controls on the equilibrium of prices and quantities

Prices exist in markets for goods and services, for labor, and for financial capital. In all of these markets, prices serve as a remarkable social mechanism for collecting, combining, and transmitting information that is relevant to the market—namely, the relationship between demand and supply—and then serving as messengers to convey that information to buyers and sellers. In a market-oriented economy, no government agency or guiding intelligence oversees the set of responses and interconnections that result from a change in price. Instead, each consumer reacts according to that person's preferences and budget set, and each profit-seeking producer reacts to the impact on its expected profits. The following Clear It Up feature examines the demand and supply models.

Clear It Up

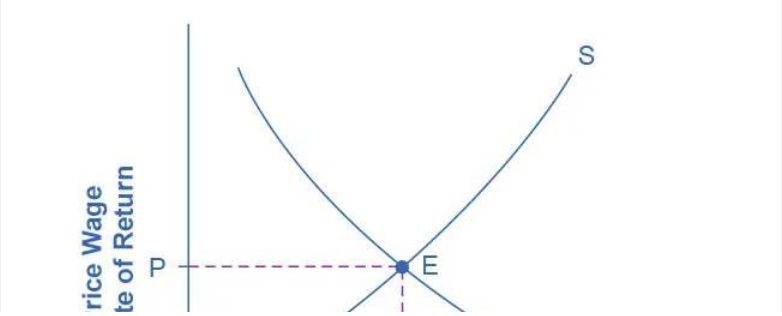
Why are demand and supply curves important?

The demand and supply model is the second fundamental diagram for this course. (The opportunity set model that we introduced in the Choice in a World of Scarcity chapter was the first.) Just as it would be foolish to try to learn the arithmetic of long division by memorizing every possible combination of numbers that can be divided by each other, it would be foolish to try to memorize every specific example of demand and supply in this chapter, this textbook, or this course. Demand and supply is not primarily a list of examples. It is a model to analyze prices and quantities. Even though demand and supply diagrams have many labels, they are fundamentally the same in their logic. Your goal should be to understand the underlying model so you can use it to analyze *any* market.

Figure 4.9 displays a generic demand and supply curve. The horizontal axis shows the different measures of quantity: a quantity of a good or service, or a quantity of labor for a given job, or a quantity of financial capital. The vertical axis shows a measure of price: the price of a good or service, the wage in the labor market, or the rate of return (like the interest rate) in the financial market.

The demand and supply model can explain the existing levels of prices, wages, and rates of return. To carry out such an analysis, think about the quantity that will be demanded at each price and the quantity that will be supplied at each price—that is, think about the shape of the demand and supply curves—and how these forces will combine to produce equilibrium.

We can also use demand and supply to explain how economic events will cause changes in prices, wages, and rates of return. There are only four possibilities: the change in any single event may cause the demand curve to shift right or to shift left, or it may cause the supply curve to shift right or to shift left. The key to analyzing the effect of an economic event on equilibrium prices and quantities is to determine which of these four possibilities occurred. The way to do this correctly is to think back to the list of factors that shift the demand and supply curves. Note that if more than one variable is changing at the same time, the overall impact will depend on the degree of the shifts. When there are multiple variables, economists isolate each change and analyze it independently.



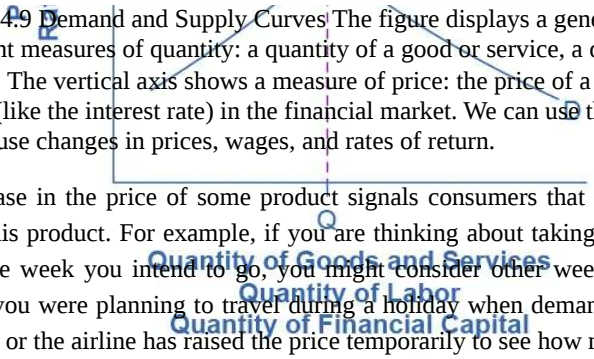


Figure 4.9 Demand and Supply Curves The figure displays a generic demand and supply curve. The horizontal axis shows the different measures of quantity: a quantity of a good or service, a quantity of labor for a given job, or a quantity of financial capital. The vertical axis shows a measure of price: the price of a good or service, the wage in the labor market, or the rate of return (like the interest rate) in the financial market. We can use the demand and supply curves explain how economic events will cause changes in prices, wages, and rates of return.

An increase in the price of some product signals consumers that there is a shortage; therefore, they may want to economize on buying this product. For example, if you are thinking about taking a plane trip to Hawaii, but the ticket turns out to be expensive during the week you intend to go, you might consider other weeks when the ticket might be cheaper. The price could be high because you were planning to travel during a holiday when demand for traveling is high. Maybe the cost of an input like jet fuel increased or the airline has raised the price temporarily to see how many people are willing to pay it. Perhaps all of these factors are present at the same time. You do not need to analyze the market and break down the price change into its underlying factors. You just have to look at the ticket price and decide whether and when to fly.

In the same way, price changes provide useful information to producers. Imagine the situation of a farmer who grows oats and learns that the price of oats has risen. The higher price could be due to an increase in demand caused by a new scientific study proclaiming that eating oats is especially healthful. Perhaps the price of a substitute grain, like corn, has risen, and people have responded by buying more oats. The oat farmer does not need to know the details. The farmer only needs to know that the price of oats has risen and that it will be profitable to expand production as a result.

The actions of individual consumers and producers as they react to prices overlap and interlock in markets for goods, labor, and financial capital. A change in any single market is transmitted through these multiple interconnections to other markets. The vision of the role of flexible prices helping markets to reach equilibrium and linking different markets together helps to explain why price controls can be so counterproductive. Price controls are government laws that serve to regulate prices rather than allow the various markets to determine prices. There is an old proverb: “Don’t kill the messenger.” In ancient times, messengers carried information between distant cities and kingdoms. When they brought bad news, there was an emotional impulse to kill the messenger. However, killing the messenger did not kill the bad news. Moreover, killing the messenger had an undesirable side effect: Other messengers would refuse to bring news to that city or kingdom, depriving its citizens of vital information.

Those who seek price controls are trying to kill the messenger—or at least to stifle an unwelcome message that prices are bringing about the equilibrium level of price and quantity. However, price controls do nothing to affect the underlying forces of demand and supply, and this can have serious repercussions. During China’s “Great Leap Forward” in the late 1950s, the government kept food prices artificially low, with the result that 30 to 40 million people died of starvation because the low prices depressed farm production. This was communist party leader Mao Zedong's social and economic campaign to rapidly transform the country from an agrarian economy to a socialist society through rapid industrialization and collectivization. Changes in demand and supply will continue to reveal themselves through consumers’ and producers’ behavior. Immobilizing the price messenger through price controls will deprive everyone in the economy of critical information. Without this information, it becomes difficult for everyone—buyers and sellers alike—to react in a flexible and appropriate manner as changes occur throughout the economy.

Bring It Home

Baby Boomers Come of Age

The theory of supply and demand can explain what happens in the labor markets and suggests that the demand for nurses will increase as healthcare needs of baby boomers increase, as Figure 4.10 shows. The impact of that increase will result in an average salary higher than the $75,330 earned in 2020 referenced in the first part of this case. The new equilibrium (E_1) will be at the new equilibrium price (Pe_1).Equilibrium quantity will also increase from Qe_0 to Qe_1.

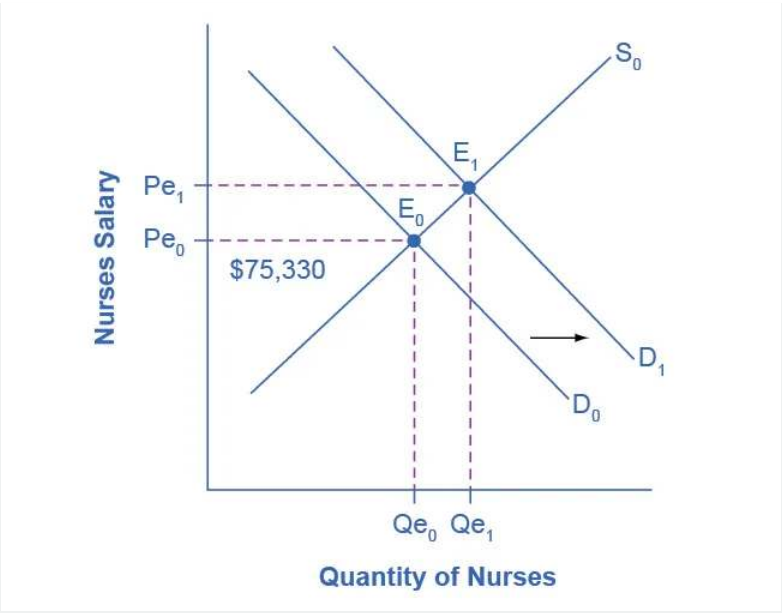


Figure 4.10 Impact of Increasing Demand for Nurses 2020–2030 In 2020, the median salary for nurses was $75,330. As demand for services increases, the demand curve shifts to the right (from D_0 to D_1) and the equilibrium quantity of nurses increases from Qe_0 to Qe_1. The equilibrium salary increases from Pe_0 to Pe_1.

Suppose that as the demand for nurses increases, the supply shrinks due to an increasing number of nurses entering retirement and increases in the tuition of nursing degrees. The leftward shift of the supply curve in Figure 4.11 captures the impact of a decreasing supply of nurses. The shifts in the two curves result in higher salaries for nurses, but the overall impact on the quantity of nurses is uncertain, as it depends on the relative shifts of supply and demand.

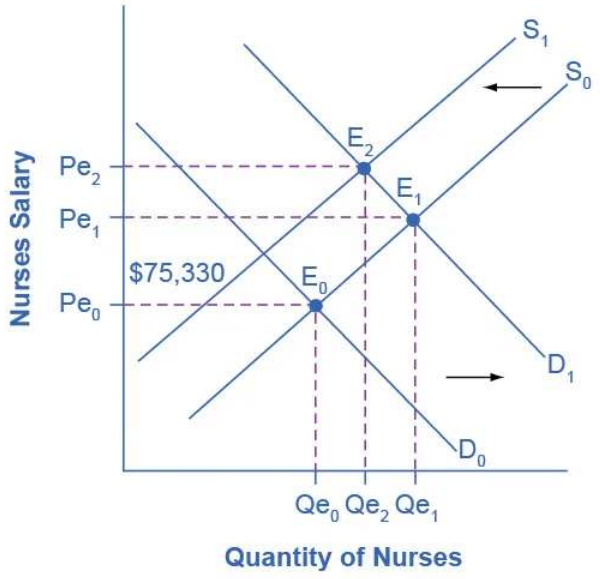


Figure 4.11 Impact of Decreasing Supply of Nurses between 2020 and 2030 The increase in demand for nurses shown in Figure 4.10 leads to both higher prices and higher quantities demanded. As nurses retire from the work force, the supply of nurses decreases, causing a leftward shift in the supply curve and higher salaries for nurses at Pe_2. The net effect on the equilibrium quantity of nurses is uncertain, which in this representation is less than Qe_1, but more than the initial Qe_0.

While we do not know if the number of nurses will increase or decrease relative to their initial employment, we know they will have higher salaries.

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5.5: Key Terms

interest rate

the “price” of borrowing in the financial market; a rate of return on an investment

minimum wage

a price floor that makes it illegal for an employer to pay employees less than a certain hourly rate

usury laws

laws that impose an upper limit on the interest rate that lenders can charge

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5.6: Key Concepts and Summary

4.1 Demand and Supply at Work in Labor Markets

In the labor market, households are on the supply side of the market and firms are on the demand side. In the market for financial capital, households and firms can be on either side of the market: they are suppliers of financial capital when they save or make financial investments, and demanders of financial capital when they borrow or receive financial investments.

In the demand and supply analysis of labor markets, we can measure the price by the annual salary or hourly wage received. We can measure the quantity of labor various ways, like number of workers or the number of hours worked.

Factors that can shift the demand curve for labor include: a change in the quantity demanded of the product that the labor produces; a change in the production process that uses more or less labor; and a change in government policy that affects the quantity of labor that firms wish to hire at a given wage. Demand can also increase or decrease (shift) in response to: workers' level of education and training, technology, the number of companies, and availability and price of other inputs.

The main factors that can shift the supply curve for labor are: how desirable a job appears to workers relative to the alternatives, government policy that either restricts or encourages the quantity of workers trained for the job, the number of workers in the economy, and required education.

4.2 Demand and Supply in Financial Markets

In the demand and supply analysis of financial markets, the "price" is the rate of return or the interest rate received. We measure the quantity by the money that flows from those who supply financial capital to those who demand it.

Two factors can shift the supply of financial capital to a certain investment: if people want to alter their existing levels of consumption, and if the riskiness or return on one investment changes relative to other investments. Factors that can shift demand for capital include business confidence and consumer confidence in the future—since financial investments received in the present are typically repaid in the future.

4.3 The Market System as an Efficient Mechanism for Information

The market price system provides a highly efficient mechanism for disseminating information about relative scarcities of goods, services, labor, and financial capital. Market participants do not need to know why prices have changed, only that the changes require them to revisit previous decisions they made about supply and demand. Price controls hide information about the true scarcity of products and thereby cause misallocation of resources.

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CHAPTER OVERVIEW

6: The Macroeconomic Perspective and GDP

Macroeconomics focuses on the economy as a whole (or on whole economies as they interact). What causes recessions? What makes unemployment stay high when recessions are supposed to be over? Why do some countries grow faster than others? Why do some countries have higher standards of living than others? These are all questions that macroeconomics addresses. 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.

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6.1: Introduction to the Macroeconomic Perspective



Figure 6.1 The Great Depression At times, such as when many people having trouble making ends meet, 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 "Waiting for relief checks. Calipatria, California" by Dorothea Lange/Library of Congress Prints and Photographs Division Washington, D.C. 20540 USA, Public Domain)

Chapter Objectives

In this chapter, you will learn about:

- Measuring the Size of the Economy: Gross Domestic Product
- Adjusting Nominal Values to Real Values
- Tracking Real GDP over Time
- Comparing GDP among Countries
- How Well GDP Measures the Well-Being of Society

Bring It Home

How is the Economy Doing? How Does One Tell?

The 1990s were boom years for the U.S. economy. Beginning in the late 2000s, from 2007 to 2014, economic performance in the U.S. was poor. The economy experienced another period of strong growth between 2014 and 2019, before COVID-19 rocked the world economy in March and April of 2020. 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 chapter. 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. How can we get a handle on that? The answer begins 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. In this chapter, you will learn how the government constructs GDP, how we use it, and why it is so important.

Macroeconomics focuses on the economy as a whole (or on whole economies as they interact). What causes recessions? What makes unemployment stay high when recessions are supposed to be over? Why do some countries grow faster than others? Why do

some countries have higher standards of living than others? These are all questions that macroeconomics addresses. Macroeconomics involves adding up the economic activity of all households and all businesses in all markets to obtain 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. What seems sensible from a microeconomic point of view can have unexpected or counterproductive results at the macroeconomic 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 as self-defeating at the macro level. This is not macroeconomics, but it is an apt analogy.

Macroeconomics is a rather massive subject. How are we going to tackle it? Figure 6.2 illustrates the structure we will use. We will study macroeconomics from three different perspectives:

1. What are the macroeconomic goals? (Macroeconomics as a discipline does not have goals, but we do have goals for the macro economy.)
2. What are the frameworks economists can use to analyze the macroeconomy?
3. Finally, what are the policy tools governments can use to manage the macroeconomy?



Figure 6.2 Macroeconomic Goals, Framework, and Policies 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 macroeconomy's overall health, it is useful to consider three primary goals: economic growth, low unemployment, and low inflation.

- Economic growth ultimately determines the prevailing standard of living in a country. Economists measure growth by the percentage change in real (inflation-adjusted) gross domestic product. A growth rate of more than 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, economists consider a measured unemployment rate of 5% or less low (good).
- Inflation is a sustained increase in the overall level of prices, and is measured by the consumer price index. 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 1–2%—is a major goal.

Frameworks

As you learn in the micro part of this book, principal tools that economists use are theories and models (see Welcome to Economics! for more on this). 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 tools for influencing the macroeconomy. The first is monetary policy, which involves managing the money supply and interest rates. The second is fiscal policy, which involves changes in government spending/purchases and taxes.

We will explain each of the items in Figure 6.2 in detail in one or more other chapters. As you learn these things, you will discover that the goals and the policy tools are in the news almost every day.

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6.2: Measuring the Size of the Economy- Gross Domestic Product

Learning Objectives

By the end of this section, you will be able to:

- Identify the components of GDP on the demand side and on the supply side
- Evaluate how economists measure gross domestic product (GDP)
- Contrast and calculate GDP, net exports, and net national product

Macroeconomics is an empirical subject, so the first step toward understanding it is to measure the economy.

How large is the U.S. economy? Economists typically measure the size of a nation's overall economy by its gross domestic product (GDP), which is the value of all final goods and services produced within a country in a given year. Measuring GDP involves counting 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 that a country produced in the current year—and summing them into a total dollar value. This task is straightforward: take the quantity of everything produced, multiply it by the price at which each product sold, and add up the total. In 2020, the U.S. GDP totaled $20.9 trillion, the largest GDP in the world.

Each of the market transactions that enter into GDP must involve both a buyer and a seller. We can measure an economy's GDP either by the total dollar value of what consumers purchase in the economy, or by the total dollar value of what is the country produces. There is even a third way, as we will explain later.

GDP Measured by Components of Demand

Who buys all of this production? We can divide this demand into four main parts: consumer spending (consumption), business spending (investment), government spending on goods and services, and spending on net exports. (See the following Clear It Up feature to understand what we mean by investment.) Table 6.1 shows how these four components added up to the GDP in 2020, Figure 6.4 (a) shows the levels of consumption, investment, and government purchases over time, expressed as a percentage of GDP, while Figure 6.4 (b) shows the levels of exports and imports as a percentage of GDP over time. A few patterns about each of these components are worth noticing. Table 6.1 shows the components of GDP from the demand side.

	Components of GDP on the Demand Side (in trillions of dollars)	Percentage of Total
Consumption	$14.0	67.2%
Investment	$3.6	17.4%
Government	$3.9	18.5%
Exports	$2.1	10.2%
Imports	–$2.7	–13.3%
Total GDP	**$20.9**	**100%**

Table 6.1 Components of U.S. GDP in 2022: From the Demand Side (Source: bea.gov/iTable/index_nipa.cfm, Table 1.1.5)

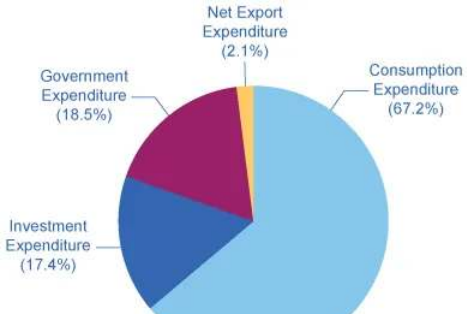
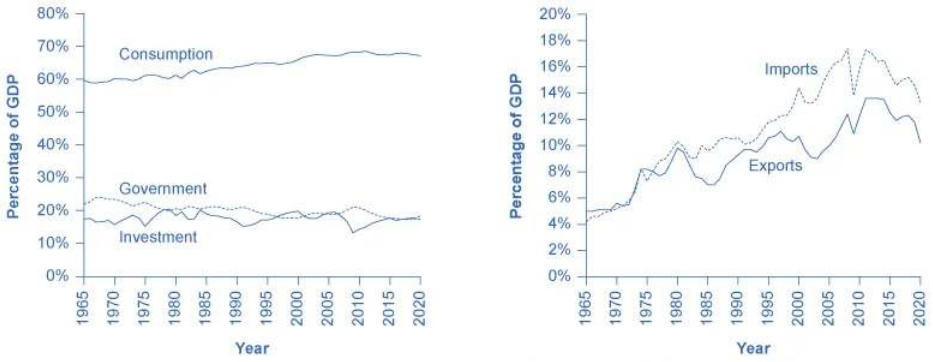


Figure 6.3 Percentage of Components of U.S. GDP on the Demand Side Consumption makes up over half of the demand side components of the GDP. Totals in the chart do not add to 100% due to rounding. (Source: bea.gov/iTable/index_nipa.cfm, Table 1.1.10)

Clear It Up

What does the word “investment” mean?

What do economists mean by investment, or business spending? In calculating GDP, investment does not refer to purchasing stocks and bonds or trading financial assets. It refers to purchasing new capital goods, that is, new commercial real estate (such as buildings, factories, and stores) and equipment, residential housing construction, and inventories. Inventories that manufacturers produce this year are included in this year’s GDP—even if they are not yet sold. From the accountant’s perspective, it is as if the firm invested in its own inventories. Business investment in 2020 was $3.6 trillion, according to the Bureau of Economic Analysis.



(a) Demand from consumption, investment, and government (b) Imports and exports

Figure 6.4 Components of GDP on the Demand Side (a) Consumption is about two-thirds of GDP, and it has been on a slight upward trend over time. Business investment hovers around 15% of GDP, but it fluctuates more than consumption. Government spending on goods and services is slightly under 20% of GDP and has declined modestly over time. (b) 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. (Source: bea.gov/iTable/index_nipa.cfm, Table 1.1.10)

Consumption expenditure by households is the largest component of GDP, accounting for about 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, and has increased modestly from about 60% of GDP in the 1960s and 1970s.

Investment expenditure refers to purchases of physical plant and equipment, primarily by businesses. If Starbucks builds a new store, or Amazon buys robots, they count these expenditures 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.

If you have noticed any of the infrastructure projects (new bridges, highways, airports) launched during the 2009 recession, or if you received a stimulus check during the pandemic-induced recession of 2020–2021, you have seen how important government spending can be for the economy. Government expenditure in the United States is close to 20% of GDP, and includes spending by all three levels of government: federal, state, and local. The only part of government spending counted in demand 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 consists of transfer payments, like unemployment benefits, veteran’s benefits, and Social Security payments to retirees. The government excludes these payments from GDP because it does not receive a new good or service in return or exchange. Instead they are transfers of income from taxpayers to others. If you are curious about the awesome undertaking of adding up GDP, read the following Clear It Up feature.

Clear It Up

How do statisticians measure GDP?

Government economists at the Bureau of Economic Analysis (BEA), within the U.S. Department of Commerce, piece together estimates of GDP from a variety of sources.

Once every five years, in the second and seventh year of each decade, the Bureau of the Census carries out a detailed census of businesses throughout the United States. In between, the Census Bureau carries out a monthly survey of retail sales. The government adjusts these figures 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 conducts a comprehensive survey of housing and residential finance. Together, these sources provide the main basis for figuring out what is produced for consumers.

For investment, the Census Bureau carries out a monthly survey of construction and an annual survey of expenditures on physical capital equipment.

For what the federal government purchases, the statisticians rely on the U.S. Department of the Treasury. An annual Census of Governments gathers information on state and local governments. Because the government spends a considerable amount at all levels hiring people to provide services, it also tracks a large portion of spending through payroll records that state governments and the Social Security Administration collect.

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 make adjustments for financial services that are produced in the United States for foreign customers.

Many other sources contribute to GDP estimates. Information on energy comes from the U.S. Department of Transportation and Department of Energy. The Agency for Health Care Research and Quality collects information on healthcare. Surveys of landlords find out about rental income. The Department of Agriculture collects statistics on farming.

All these bits and pieces of information arrive in different forms, at different time intervals. The BEA melds them together to produce GDP estimates on a quarterly basis (every three months). The BEA then "annualizes" these numbers by multiplying by four. As more information comes in, the BEA updates and revises these estimates. BEA releases the GDP “advance” estimate for a certain quarter one month after a quarter. The “preliminary” estimate comes out one month after that. The BEA publishes the “final” estimate one month later, but it is not actually final. In July, the BEA releases roughly updated estimates for the previous calendar year. Then, once every five years, after it has processed all the results of the latest detailed five-year business census, the BEA revises all of the past GDP estimates according to the newest methods and data, going all the way back to 1929.

Link It Up

Visit this website to read FAQs on the BEA site. You can even email your own questions!

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 a country sells abroad. Similarly, we must also subtract spending on imports—goods that a country produces in other countries that residents of this country purchase. The GDP net export component is equal to the dollar value of exports (X) minus the dollar value of imports (M), (X – M). We call the gap between exports and imports the trade balance. If a country’s exports are larger than its imports, then a country has a trade surplus. In the United States, exports typically exceeded imports in the 1960s and 1970s, as Figure 6.4(b) shows.

Since the early 1980s, imports have typically exceeded exports, and so the United States has experienced a trade deficit in most years. The trade deficit grew quite large in the late 1990s and in the mid-2000s. Figure 6.4 (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 we 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.

Based on these four components of demand, we can measure GDP as:

GDP = Consumption + Investment + Government + Trade balanceGDP = C + I + G + (X – M)GDP = Consumption + Investment + Government + Trade balanceGDP = C + I + G + (X – M)

Understanding how to measure GDP is important for analyzing connections in the macro economy and for thinking about macroeconomic policy tools.

GDP Measured by What is Produced

Everything that we purchase somebody must first produce. Table 6.2 breaks down what a country produces into five categories: durable goods, nondurable goods, services, structures, and the change in inventories. Before going into detail about these categories, notice that total GDP measured according to what is produced is exactly the same as the GDP measured by looking at the five components of demand. Figure 6.5 provides a visual representation of this information.

	Components of GDP on the Supply Side (in trillions of dollars)	Percentage of Total
Goods		
Durable goods	$3.5	16.7%
Nondurable goods	$2.8	13.4%
Services	$12.7	60.8%
Structures	$1.9	9.1%
Change in inventories	$0.0	0.0%
Total GDP	**$20.9**	**100%**

Table 6.2 Components of U.S. GDP on the Production Side, 2020 (Source: bea.gov/iTable/index_nipa.cfm, Table 1.2.5)

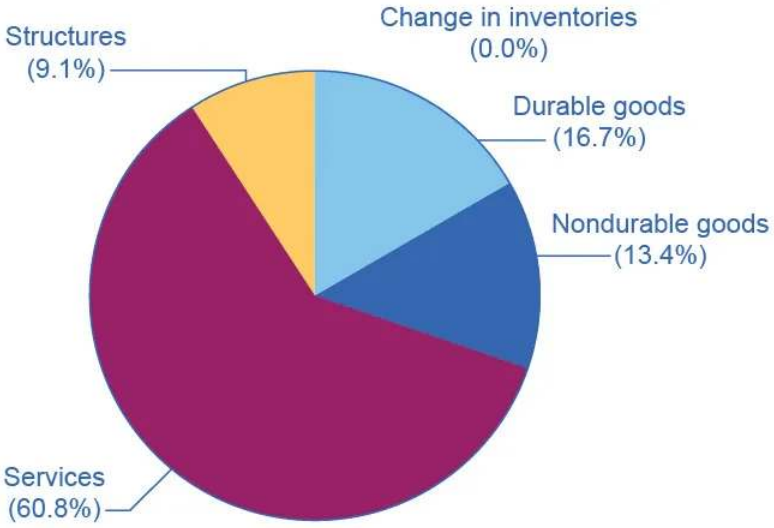


Figure 6.5 Percentage of Components of GDP on the Production Side Services make up over 60 percent of the production side components of GDP in the United States.

Since every market transaction must have both a buyer and a seller, GDP must be the same whether measured by what is demanded or by what is produced. Figure 6.6 shows these components of what is produced, expressed as a percentage of GDP, since 1950.

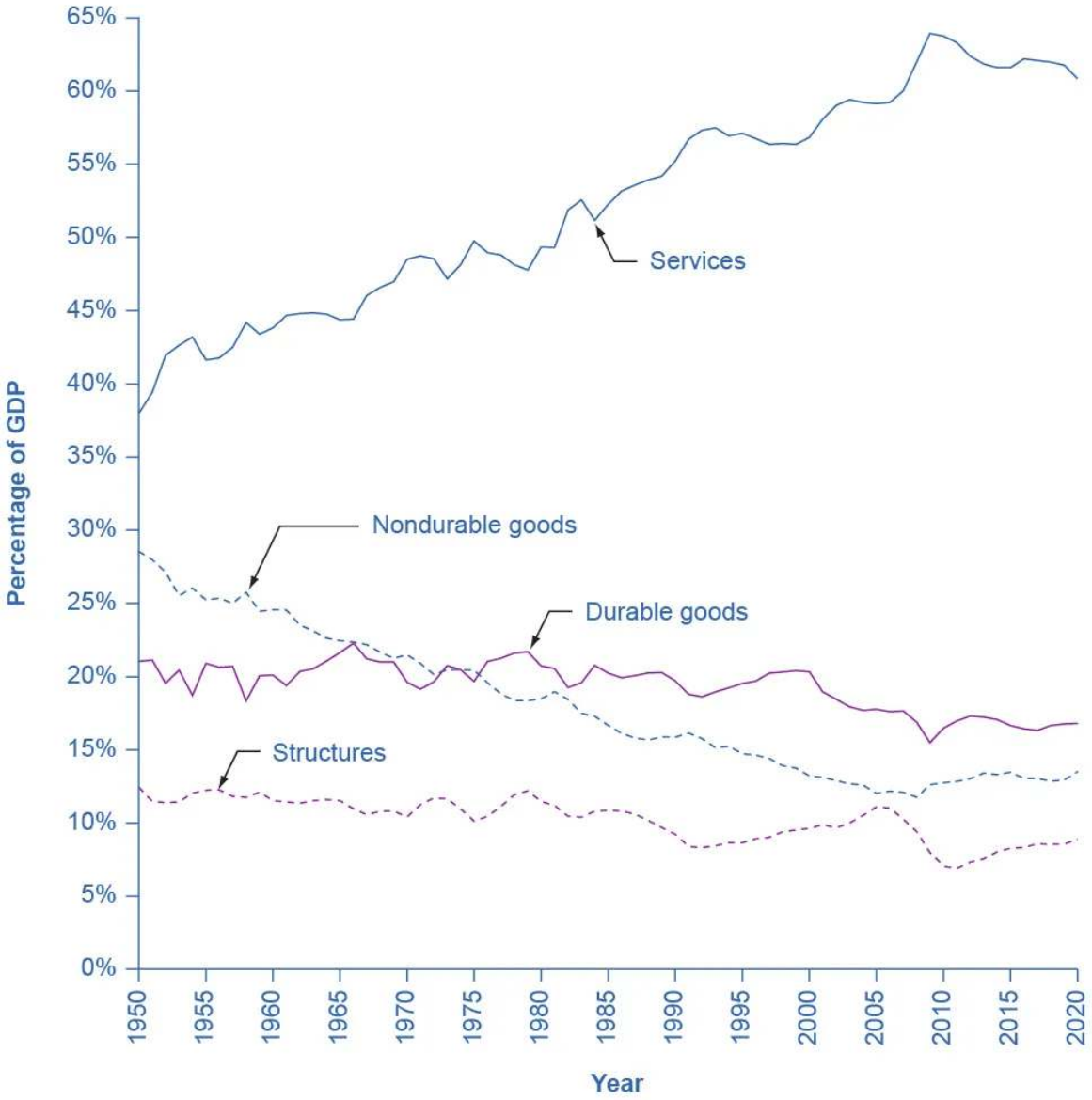


Figure 6.6 Types of Production Services are the largest single component of total supply, representing over 60 percent of GDP, up from about 45 percent in the early 1950s. Durable and nondurable goods constitute the manufacturing sector, and they have declined from 40 percent of GDP in 1950 to about 30 percent in 2016. Nondurable goods used to be larger than durable goods, but in recent years, nondurable goods have been dropping to below the share of durable goods, which is less than 20% of GDP. Structures hover around 10% of GDP. We do not show here the change in inventories, the final component of aggregate supply. It is typically less than 1% of GDP.

In thinking about what is produced in the economy, many non-economists immediately focus on solid, long-lasting goods, like cars and computers. 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, 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. The category of structures includes everything from homes, to office buildings, shopping malls, and factories. Inventories is a small category that refers to the goods that one business has

produced but has not yet 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.

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.

The Problem of Double Counting

We define GDP as the current value of all final goods and services produced in a nation in a year. What are final goods? They are goods at the furthest stage of production at the end of a year. Statisticians who calculate GDP must avoid the mistake of double counting, in which they count output more than once as it travels through the production stages. For example, imagine what would happen if government statisticians first counted the value of tires that a tire manufacturer produces, and then counted the value of a new truck that an automaker sold that contains those tires. In this example, the statisticians would have counted the value of the tires twice-because the truck's price includes the value of the tires.

To avoid this problem, which would overstate the size of the economy considerably, government statisticians count just the value of final goods and services in the chain of production that are sold for consumption, investment, government, and trade purposes. Statisticians exclude intermediate goods, which are goods that go into producing other goods, from GDP calculations. From the example above, they will only count the Ford truck's value. The value of what businesses provide to other businesses is captured in the final products at the end of the production chain.

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 $21 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	What is not included in GDP
Consumption	Intermediate goods
Business investment	Transfer payments and non-market activities
Government spending on goods and services	Used goods
Net exports	Illegal goods

Table 6.3 Counting GDP

Notice the items that are not counted into GDP, as Table 6.3 outlines. The sales of used goods are not included because they were produced in a previous year and are part of that year's GDP. The entire underground economy of services paid "under the table" and illegal sales should be counted, but is not, because it is impossible to track these sales. In Friedrich Schneider's recent study of shadow economies, he estimated the underground economy in the United States to be 6.6% of GDP, or close to $2 trillion dollars in 2013 alone. Transfer payments, such as payment by the government to individuals, are not included, because they do not represent production. Also, production of some goods—such as home production as when you make your breakfast—is not counted because these goods are not sold in the marketplace.

Link It Up

Visit this website to read about the "New Underground Economy."

Other Ways to Measure the Economy

Besides GDP, there are several different but closely related ways of measuring the size of the economy. We mentioned above that we can think of GDP as total production and as total purchases. We can also think of it as total income since anything one produces and sells yields income.

One of the closest cousins of GDP is the gross national product (GNP). GDP includes only what country produces within its borders. GNP adds what domestic businesses and labor abroad produces, and subtracts any payments that foreign labor and businesses located in the United States send home to other countries. In other words, GNP is based more on what a country's citizens and firms produce, wherever they are located, and GDP is based on what happens within a certain county's geographic boundaries. 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.

We calculate net national product (NNP) 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. We can further subdivide NNP into national income, which includes all income to businesses and individuals, and personal income, which includes only income to people.

The gross national income (GNI) includes the value of all goods and services produced by people from a country—whether in the country or not. Unlike the other methods, GNI essentially measures the wealth of a nation because it focuses on income, not output. As you will see in the discussion regarding global economic diversity, the World Bank now uses GNI to classify nations according to economic status.

For practical purposes, it is not vital to memorize these definitions. However, it is important to be aware that these differences exist and to know what statistic you are examining, so that you do not accidentally compare, say, GDP in one year or for one country with GNP or NNP in another year or another country. To get an idea of how these calculations work, follow the steps in the following Work It Out feature.

Work It Out

Calculating GDP, Net Exports, and NNP

Based on the information in Table 6.4:

a. What is the value of GDP?
b. What is the value of net exports?
c. What is the value of NNP?

Government purchases	$120 billion
Depreciation	$40 billion
Consumption	$400 billion
Business 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

Table 6.4

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 billionGDP = 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 billionNet 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 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

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6.3: Adjusting Nominal Values to Real Values

Learning Objectives

By the end of this section, you will be able to:

- Contrast nominal GDP and real GDP
- Explain GDP deflator
- Calculate real GDP based on nominal GDP values

When examining economic statistics, there is a crucial distinction worth emphasizing. The distinction is between nominal and real measurements, which refer to whether or not inflation has distorted a given statistic. 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. Similarly, 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. The real value refers to the same statistic after it has been adjusted for inflation. Generally, it is the real value that is more important.

Converting Nominal to Real GDP

Table 6.5 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. Figure 6.7 also reflects this data in a graph.

Year	Nominal GDP (billions of dollars)	GDP Deflator (2005 = 100)
1960	542.4	16.6
1965	742.3	17.8
1970	1,073.3	21.7
1975	1,684.9	29.8
1980	2,857.3	42.2
1985	4,339.0	54.5
1990	5,963.1	63.6
1995	7,639.7	71.8
2000	10,251.0	78.0
2005	13,039.2	87.5
2010	15,049.0	96.2
2015	18,206.0	10.47
2020	20,893.7	113.6

Table 6.5 U.S. Nominal GDP and the GDP Deflator (Source: https://apps.bea.gov/itable/index.cfm, Table 1.1.5 and Table 1.1.9)



Figure 6.7 U.S. Nominal GDP, 1960–2020 Nominal GDP values have risen exponentially from 1960 through 2020, 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 more than 38 over this time (that is, GDP of $20.9 trillion in 2020 divided by GDP of $543 billion in 1960 = 38). This conclusion would be highly misleading. Recall that we define nominal GDP 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 order to see how much production has actually increased, we need to extract the effects of higher prices on nominal GDP. We can easily accomplish this using the GDP deflator.

The GDP deflator is a price index measuring the average prices of all final goods and services included in the economy. We explore price indices in detail and how we compute them in Inflation, but this definition will do in the context of this chapter. Table 6.5 provides the GDP deflator data and Figure 6.8 shows it graphically.

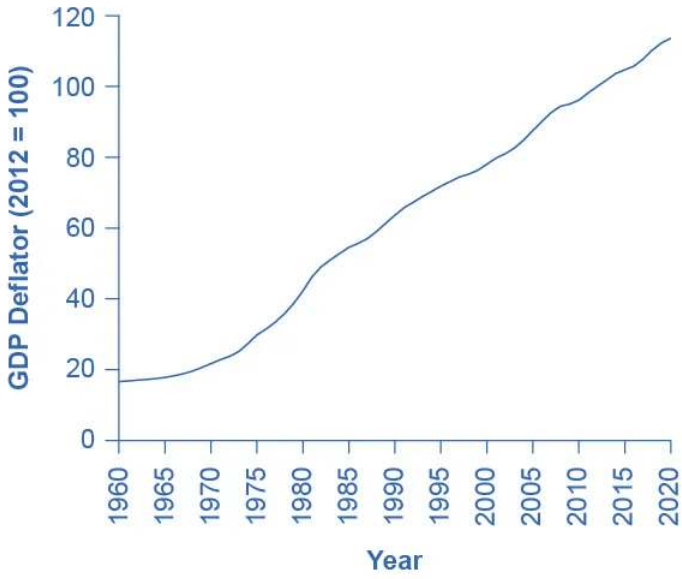


Figure 6.8 U.S. GDP Deflator, 1960–2020 Much like nominal GDP, the GDP deflator has risen exponentially from 1960 through 2010. (Source: BEA https://apps.bea.gov/itable/index.cfm, Table 1.1.9)

Figure 6.8 shows that the price level has risen dramatically since 1960. The price level in 2020 was seven times higher than in 1960 (the deflator for 2020 was 113 versus a level of 17 in 1960). Clearly, much of the 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 2020—and the price index tells exactly how much more. This adjustment is easy to do if you understand that nominal measurements are in value terms, where

Value = Price × Quantity orNominal GDP = GDP Deflator × Real GDPValue = Price × Quantity orNominal GDP = GDP Deflator × Real GDP

Let’s look at an example at the micro level. Suppose the t-shirt company, Coolshirts, sells 10 t-shirts at a price of $9 each.

Coolshirt's nominal revenue from sales = Price × Quantity = $9 × 10 = $90Coolshirt's nominal revenue from sales = Price × Quantity = $9 × 10 = $90

Then,

Coolshirt's real income = Nominal revenuePrice = $90$9 = 10Coolshirt's real income = Nominal revenuePrice = $90$9 = 10

In other words, when we compute “real” measurements we are trying to obtain actual quantities, in this case, 10 t-shirts.

With GDP, it is just a tiny bit more complicated. We start with the same formula as above:

Real GDP = Nominal GDPPrice IndexReal GDP = Nominal GDPPrice Index

For reasons that we will explain in more detail below, mathematically, a price index 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. Thus, the formula becomes:

Real GDP = Nominal GDPPrice Index / 100Real GDP = Nominal GDPPrice Index / 100

Now read the following Work It Out feature for more practice calculating real GDP.

Work It Out

Computing GDP

It is possible to use the data in Table 6.5 to compute real GDP.

Step 1. Look at Table 6.5, 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:

Real GDP = Nominal GDPPrice Index / 100 = $543.3 billion19 / 100 = $2,859.5 billionReal GDP = Nominal GDPPrice Index / 100 = $543.3 billion19 / 100 = $2,859.5 billion

We'll do this in two parts to make it clear. First adjust the price index: 19 divided by 100 = 0.19. Then divide into nominal GDP: $543.3 billion / 0.19 = $2,859.5 billion.

Step 3. Use the same formula to calculate the real GDP in 1965.

Real GDP = Nominal GDPPrice Index / 100 = $743.7 billion20.3 / 100 = $3,663.5 billionReal GDP = Nominal GDPPrice Index / 100 = $743.7 billion20.3 / 100 = $3,663.5 billion

Step 4. Continue using this formula to calculate all of the real GDP values from 1960 through 2010. The calculations and the results are in Table 6.6.

Year	Nominal GDP (billions of dollars)	GDP Deflator (2005 = 100)	Calculations	Real GDP (billions of 2005 dollars)
1960	543.3	19.0	543.3 / (19.0/100)	2859.5
1965	743.7	20.3	743.7 / (20.3/100)	3663.5
1970	1075.9	24.8	1,075.9 / (24.8/100)	4338.3
1975	1688.9	34.1	1,688.9 / (34.1/100)	4952.8
1980	2862.5	48.3	2,862.5 / (48.3/100)	5926.5
1985	4346.7	62.3	4,346.7 / (62.3/100)	6977.0
1990	5979.6	72.7	5,979.6 / (72.7/100)	8225.0
1995	7664.0	82.0	7,664 / (82.0/100)	9346.3
2000	10289.7	89.0	10,289.7 / (89.0/100)	11561.5
2005	13095.4	100.0	13,095.4 / (100.0/100)	13095.4
2010	14958.3	110.0	14,958.3 / (110.0/100)	13598.5

Table 6.6 Converting Nominal to Real GDP (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 we use to compute the real statistic. 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, in this example, “2005 Dollars,” which means that real GDP is constructed using prices that existed in 2005. While the example here uses 2005 as the base year, more generally, you can use any year as the base year. The formula is:

GDP deflator = Nominal GDPReal GDP × 100GDP deflator = Nominal GDPReal GDP × 100

Rearranging the formula and using the data from 2005:

Real GDP = Nominal GDPPrice Index / 100 = $13,095.4 billion100 / 100 = $13,095.4 billionReal GDP = Nominal GDPPrice Index / 100 = $13,095.4 billion100 / 100 = $13,095.4 billion

Comparing real GDP and nominal GDP for 2005, you see they are the same. This is no accident. It is because we have chosen 2005 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.

Real GDP = Nominal GDPPrice Index / 100 = $14,958.3 billion110 / 100 = $13,598.5 billionReal GDP = Nominal GDPPrice Index / 100 = $14,958.3 billion110 / 100 = $13,598.5 billion

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.

Figure 6.9 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 presence of inflation, especially in the 1970s exaggerates the rise in nominal GDP.

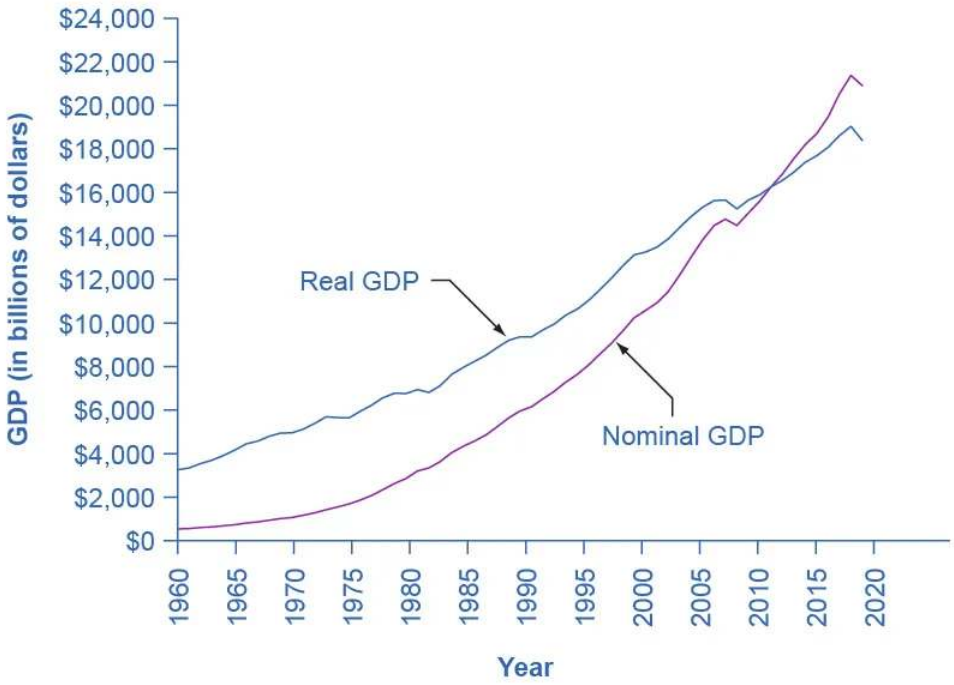


Figure 6.9 U.S. Nominal and Real GDP, 1960–2020 The red line measures U.S. GDP in nominal dollars. The black line measures U.S. GDP in real dollars, where all dollar values are converted to 2012 dollars. Since we express real GDP in 2012 dollars, the two lines cross in 2012. However, real GDP will appear higher than nominal GDP in the years before 2012, because dollars were worth less in 2012 than in previous years. Conversely, real GDP will appear lower in the years after 2012, because dollars were worth more in 2012 than in later years.

Let’s return to the question that we posed originally: How much did GDP increase in real terms? What was the real GDP growth rate from 1960 to 2012? To find the real growth rate, we apply the formula for percentage change:

2020 real GDP – 1960 real GDP1960 real GDP × 100 = % change13,598.5 – 2,859.52,859.5 × 100 = 376%2020 real GDP – 1960 real GDP1960 real GDP × 100 = % change13,598.5 – 2,859.52,859.5 × 100 = 376%

In other words, the U.S. economy has increased real production of goods and services by nearly a factor of five 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.

There is a quicker way to answer this question approximately, using another math trick. Because:

Nominal = Price × Quantity % change in Nominal = % change in Price + % change in Quantity OR % change in Quantity = % change in Nominal – % change in PriceNominal = Price × Quantity % change in Nominal = % change in Price + % change in Quantity OR % change in Quantity = % change in Nominal – % change in Price

Therefore, real GDP growth rate (% change in quantity) equals the growth rate in nominal GDP (% change in value) minus the inflation rate (% change in price).

Note that using this equation provides an approximation for small changes in the levels. For more accurate measures, one should use the first formula.

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6.4: Tracking Real GDP over Time

Learning Objectives

By the end of this section, you will be able to:

- Explain recessions, depressions, peaks, and troughs
- Evaluate the importance of 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, governments report GDP growth at an annualized rate: Whatever the calculated growth in real GDP was for the quarter, we multiply it by four when it is reported as if the economy were growing at that rate for a full year.

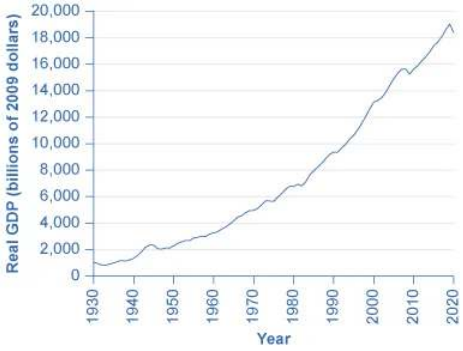


Figure 6.10 U.S. GDP, 1930–2020 Real GDP in the United States in 2020 (in 2012 dollars) was about $18.4 trillion. After adjusting to remove the effects of inflation, this represents a roughly 20-fold increase in the economy's production of goods and services since 1930. (Source: bea.gov)

Figure 6.10 shows the pattern of U.S. real GDP since 1930. Short term declines have regularly interrupted the generally upward long-term path of GDP. We call a significant decline in real GDP a recession. We call an especially lengthy and deep recession a depression. The severe drop in GDP that occurred during the 1930s Great Depression is clearly visible in the figure, as is the 2008–2009 Great Recession and the recession induced by COVID-19 in 2020.

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 their workers. 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—or their employers may ask them to take pay cuts.

Table 6.7 lists the pattern of recessions and expansions in the U.S. economy since 1900. We call the highest point of the economy, before the recession begins, the peak. Conversely, the lowest point of a recession, before a recovery begins, is the trough. Thus, a recession lasts from peak to trough, and an economic upswing runs from trough to peak. We call the economy's movement from peak to trough and trough to peak 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 was caused by the COVID-19 pandemic. It started in February 2020 and ended formally in May 2020. This was the most severe recession since the 1930s Great Depression, but also the shortest. The previous recession, called the Great Recession, was also very severe and lasted about 18 months. The expansion starting in June 2009, the trough from the Great Recession, was the longest on record—ending 128 months with the pandemic-induced recession.

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 1991	March 2001	8	120
November 2001	December 2007	8	73
January 2009	February 2020	2	128
April 2020	TBD	TBD	TBD

Table 6.7 U.S. Business Cycles since 1900 (Source: http://www.nber.org/cycles/main.html)

A private think tank, the National Bureau of Economic Research (NBER), tracks business cycles for the U.S. economy. However, the effects of a severe recession often linger after the official ending date assigned by the NBER.

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6.5: Comparing GDP among Countries

Learning Objectives

By the end of this section, you will be able to:

- Explain how we can use GDP to compare the economic welfare of different nations
- Calculate the conversion of GDP to a common currency by using exchange rates
- Calculate GDP per capita using population data

It is common to use GDP as a measure of economic welfare or standard of living in a nation. When comparing the GDP of different nations for this purpose, two issues immediately arise. First, we measure a country's GDP in its own currency: the United States uses the U.S. dollar; Canada, the Canadian dollar; most countries of Western Europe, the euro; Japan, the yen; Mexico, the peso; and so on. Thus, comparing GDP between two countries requires converting to a common currency. A second issue is that countries have very different numbers of people. For instance, the United States has a much larger economy than Mexico or Canada, but it also has almost three times as many people as Mexico and nine times as many people as Canada. Thus, if we are trying to compare standards of living across countries, we need to divide GDP by population.

Converting Currencies with Exchange Rates

To compare the GDP of countries with different currencies, it is necessary to convert to a “common denominator” using an exchange rate, which is the value of one currency in terms of another currency. We express exchange rates either as the units of country A’s currency that need to be traded for a single unit of country B’s currency (for example, Japanese yen per British pound), or as the inverse (for example, British pounds per Japanese yen). We can use two types of exchange rates for this purpose, market exchange rates and purchasing power parity (PPP) equivalent exchange rates. Market exchange rates vary on a day-to-day basis depending on supply and demand in foreign exchange markets. PPP-equivalent exchange rates provide a longer run measure of the exchange rate. For this reason, economists typically use PPP-equivalent exchange rates for GDP cross country comparisons. We will discuss exchange rates in more detail in Exchange Rates and International Capital Flows. The following Work It Out feature explains how to convert GDP to a common currency.

Work It Out

Converting GDP to a Common Currency

Using the exchange rate to convert GDP from one currency to another is straightforward. Say that the task is to compare Brazil’s GDP in 2020 of 7.4 trillion reals with the U.S. GDP of $20.9 trillion for the same year.

Step 1. Determine the exchange rate for the specified year. In 2020, the exchange rate was 2.362 reals = $1. (These numbers are realistic, but rounded off to simplify the calculations.)

Step 2. Convert Brazil’s GDP into U.S. dollars:

Brazil's GDP in $ U.S. = Brazil's GDP in realsExchange rate (reals/$ U.S.) = 7.4 trillion reals2.362 reals per $ U.S. = $3.1 trillionBrazil's GDP in $ U.S. = Brazil's GDP in realsExchange rate (reals/$ U.S.) = 7.4 trillion reals2.362 reals per $ U.S. = $3.1 trillion

Step 3. Compare this value to the GDP in the United States in the same year. The U.S. GDP was $20.9 trillion in 2020, which is almost seven times that of GDP in Brazil.

Step 4. View Table 6.8 which shows the size of and variety of GDPs of different countries in 2020, all expressed in U.S. dollars. We calculate each using the process that we explained above.

Country	GDP in Billions of Domestic Currency		Domestic Currency/U.S. Dollars (PPP Equivalent)	GDP (in billions of U.S. dollars)
Brazil	7,447.86	reals	2.362	3,153.60
Canada	2,204.91	dollars	1.206	1,827.70
China	101,598.62	yuan	4.186	24,273.31
Egypt	5,820.00	pounds	4.511	1,290.21
Germany	3,367.56	euros	0.746	4,516.93
India	195,861.61	rupees	21.990	8,907.02
Japan	531,247.88	yen	102.835	5,166.00
Mexico	23,122.02	pesos	9.522	2,428.20
South Korea	1,924,452.90	won	861.824	2,233.00
United Kingdom	2,112.04	pounds	0.700	3,019.06
United States	20,936.60	dollars	1.000	20,936.60

Table 6.8 Comparing GDPs Across Countries, 2020 (Source: https://data.worldbank.org/indicator...GDP.MKTP.CN.AD)

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. 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? We can answer this question by calculating a country's GDP per capita; that is, the GDP divided by the population.

GDP per capita = GDP/populationGDP per capita = GDP/population

The second column of Table 6.9 lists the GDP of the same selection of countries that appeared in the previous Tracking Real GDP over Time and Table 6.8, showing their GDP as converted into U.S. dollars (which is the same as the last column of the previous table). The third column gives the population for each country. The fourth column lists the GDP per capita. We obtain GDP per capita in two steps: First, by multiplying column two (GDP, in billions of dollars) by 1000 so it has the same units as column three (Population, in millions). Then divide the result (GDP in millions of dollars) by column three (Population, in millions).

Country	GDP (in billions of U.S. dollars)	Population (in millions)	Per Capita GDP (in U.S. dollars)
Brazil	3,153.60	212.56	14,836.27
Canada	1,827.71	38.00	48,097.62
China	24,273.36	1,402.11	17,312.02
Egypt	1,290.21	102.33	12,608.30
Germany	4,516.94	83.24	54,263.99
India	8,907.03	1,380.00	6,454.37
Japan	5,166.00	125.84	41,052.13
Mexico	2,428.20	128.93	18,833.48
South Korea	2,233.00	51.78	43,124.78
United Kingdom	3,019.60	67.22	44,913.08
United States	20,936.60	329.48	63,544.37

Table 6.9 GDP Per Capita, 2020 (Source: https://data.worldbank.org/indicator/NY.GDP.MKTP.CD)

Notice that the rankings by GDP in billions of U.S. dollars, and by GDP per capita, are different than the ranking of GDP by each country's currency. Measured by its own currency, the rupee, India has a somewhat larger GDP than Germany. On a per capita basis in U.S. dollars, Germany has more than 9 times India's per capita GDP on PPP terms.

Clear It Up

Is China going to surpass the United States in terms of standard of living?

China has the largest GDP in PPP terms: $24 trillion compared to the United States' $21 trillion. But China has a much larger population so that in per capita terms, its GDP is less than one fourth that of the United States ($17,000 compared to $63,000). The Chinese people are still quite poor relative to the United States and other developed countries. One caveat: For reasons we will discuss shortly, GDP per capita can give us only a rough idea of the differences in living standards across countries.

The world's high-income nations—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 world's low-income countries, many of them located in Africa and Asia, often have GDP per capita of less than $2,000 per year.

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6.6: How Well GDP Measures the Well-Being of Society

Learning Objectives

By the end of this section, you will be able to:

- Discuss how productivity influences the standard of living
- Explain the limitations of GDP as a measure of the standard of living
- Analyze the relationship between GDP data and fluctuations in 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” is a broader term than GDP. 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 bought and sold in the market or not. To illuminate the difference 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.

Limitations of GDP as a Measure of the Standard of Living

GDP measures economic activity, not all activity. As a result, economists like Kate Raworth see it as a somewhat outdated and limited indication of well-being and prosperity. While GDP measures output of work done at home, as well as spending on travel, it doesn't capture unpaid work or leisure time. So, two countries may have equal GDP, but one nation's workers may have an average workday of eight hours, while the other has an average workday of twelve hours. In that case, is their equal GDP truly measuring the prosperity of those nations? The GDP per capita of the U.S. economy is larger than the GDP per capita of Germany, as Table 6.9 showed, 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. Calculating GDP does not account for the German worker’s extra vacation weeks.

While GDP includes what a country spends 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 the growth in women’s participation in the labor force. 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 people actually are not consuming more services. However, as Raworth points out and was explored in the chapter on the labor market, even women who are fully employed expend significant effort (generally more than men) in raising children and maintaining a home. Raworth advocates that economic measures include monetized and un-monetized goods and services, so that the status and contributors to each economy are more accurate.

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 GDP 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 the total amount the family spends on bread.

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 installing bars and burglar alarms on all their windows, it is hard to believe that this increase in GDP has made them better off. Similarly, 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.

Does a Rise in GDP Overstate or Understate the Rise in the Standard of Living?

The fact that GDP per capita does not fully capture the broader idea of standard of living has led to a concern that the increases in GDP over time are illusory. It is theoretically possible that while GDP is rising, the standard of living could be falling if human health, environmental cleanliness, and other factors that are not included in GDP are worsening. Fortunately, this fear appears to be overstated.

In some ways, the rise in GDP understates the actual rise in the standard of living. For example, the typical workweek for a U.S. worker has fallen over the last century from about 60 hours per week to less than 40 hours per week. Life expectancy and health have risen dramatically, and so has the average level of education. Since 1970, the air and water in the United States have generally been getting cleaner. Companies have developed new technologies for entertainment, travel, information, and health. A much wider variety of basic products like food and clothing is available today than several decades ago. Because GDP does not capture leisure, health, a cleaner environment, the possibilities that new technology creates, or an increase in variety, the actual rise in the standard of living for Americans in recent decades has exceeded the rise in GDP.

On the other side, crime rates, traffic congestion levels, and income inequality are higher in the United States now than they were in the 1960s. Moreover, a substantial number of services that women primarily provided in the non-market economy are now part of the market economy that GDP counts. By ignoring these factors, GDP would tend to overstate the true rise in the standard of living.

Link It Up

Visit this website to read about the American Dream and standards of living.

GDP is Rough, but Useful

A high level of GDP should not be the only goal of macroeconomic policy, or government policy more broadly. Even though GDP does not measure the broader standard of living with any precision, it does measure production well and it does indicate when a country is materially better or worse off in terms of jobs and incomes. In most countries, a significantly higher GDP per capita occurs hand in hand with other improvements in everyday life along many dimensions, like education, health, and environmental protection.

No single number can capture all the elements of a term as broad as "standard of living." Nonetheless, GDP per capita is a reasonable, rough-and-ready measure of the standard of living.

Bring It Home

How is the Economy Doing? How Does One Tell?

To determine the state of the economy, one needs to examine economic indicators, such as GDP. To calculate GDP is quite an undertaking. It is the broadest measure of a nation's economic activity and we owe a debt to Simon Kuznets, the creator of the measurement, for that.

The sheer size of the U.S. economy as measured by nominal GDP is huge—as of the third quarter of 2021, $23.2 trillion worth of goods and services were produced annually. During the COVID-19-induced recession, which lasted just two months according to NBER and was concentrated across Quarters 1 and 2 of 2020, real GDP dropped 9%—much larger and quicker of a drop than during the previous economic downturn, the Great Recession (2007–2009). The economy quickly bounced back, and as of Quarter 1 of 2021, real GDP had slightly surpassed the level it was at prior to the start of the pandemic. These statistics show the severity of the pandemic-induced recession, and while real GDP fully recovered, there are other ways in

which the economy has not. While GDP and GDP per capita give us a rough estimate of a nation's standard of living, there are many other ways to track the health of the economy. This chapter is the building block for other chapters that explore more economic indicators such as unemployment, inflation, or interest rates, and perhaps more importantly, will explain how they are related and what causes them to rise or fall.

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6.7: Key Terms

business cycle
the economy's relatively short-term movement in and out of recession

depreciation
the process by which capital ages over time and therefore loses its value

depression
an especially lengthy and deep decline in output

double counting
a potential mistake to avoid in measuring GDP, in which output is counted more than once as it travels through the stages of production

durable good
long-lasting good like a car or a refrigerator

exchange rate
the price of one currency in terms of another currency

final good and service
output used directly for consumption, investment, government, and trade purposes; contrast with “intermediate good”

GDP per capita
GDP divided by the population

gross domestic product (GDP)
the value of the output of all final goods and services produced within a country in a year

gross national product (GNP)
includes what is produced domestically and what is produced by domestic labor and business abroad in a year

intermediate good
output provided to other businesses at an intermediate stage of production, not for final users; contrast with “final good and service”

inventory
good that has been produced, but not yet been sold

national income
includes all income earned: wages, profits, rent, and profit income

net national product (NNP)
GNP minus depreciation

nominal value
the economic statistic actually announced at that time, not adjusted for inflation; contrast with real value

nondurable good
short-lived good like food and clothing

peak

during the business cycle, the highest point of output before a recession begins

real value
an economic statistic after it has been adjusted for inflation; contrast with nominal value

recession
a significant decline in national output

service
product which is intangible (in contrast to goods) such as entertainment, healthcare, or education

standard of living
all elements that affect people’s happiness, whether people buy or sell these elements in the market or not

structure
building used as residence, factory, office building, retail store, or for other purposes

trade balance
gap between exports and imports

trade deficit
exists when a nation's imports exceed its exports and it calculates them as imports –exports

trade surplus
exists when a nation's exports exceed its imports and it calculates them as exports – imports

trough
during the business cycle, the lowest point of output in a recession, before a recovery begins

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6.8: Key Concepts and Summary

6.1 Measuring the Size of the Economy: Gross Domestic Product

Economists generally express the size of a nation's economy as its gross domestic product (GDP), which measures the value of the output of all goods and services produced within the country in a year. Economists measure GDP by taking the quantities of all goods and services produced, multiplying them by their prices, and summing the total. Since GDP measures what is bought and sold in the economy, we can measure it either by the sum of what is purchased in the economy or what is produced.

We can divide demand into consumption, investment, government, exports, and imports. We can divide what is produced in the economy into durable goods, nondurable goods, services, structures, and inventories. To avoid double counting, GDP counts only final output of goods and services, not the production of intermediate goods or the value of labor in the chain of production.

6.2 Adjusting Nominal Values to Real Values

The nominal value of an economic statistic is the commonly announced value. The real value is the value after adjusting for changes in inflation. To convert nominal economic data from several different years into real, inflation-adjusted data, the starting point is to choose a base year arbitrarily and then use a price index to convert the measurements so that economists measure them in the money prevailing in the base year.

6.3 Tracking Real GDP over Time

Over the long term, U.S. real GDP have increased dramatically. At the same time, GDP has not increased the same amount each year. The speeding up and slowing down of GDP growth represents the business cycle. When GDP declines significantly, a recession occurs. A longer and deeper decline is a depression. Recessions begin at the business cycle's peak and end at the trough.

6.4 Comparing GDP among Countries

Since we measure GDP in a country's currency, in order to compare different countries' GDPs, we need to convert them to a common currency. One way to do that is with the exchange rate, which is the price of one country's currency in terms of another. Once we express GDPs in a common currency, we can compare each country's GDP per capita by dividing GDP by population. Countries with large populations often have large GDPs, but GDP alone can be a misleading indicator of a nation's wealth. A better measure is GDP per capita.

6.5 How Well GDP Measures the Well-Being of Society

GDP is an indicator of a society's standard of living, but it is only a rough indicator. GDP does not directly take account of leisure, environmental quality, levels of health and education, activities conducted outside the market, changes in inequality of income, increases in variety, increases in technology, or the (positive or negative) value that society may place on certain types of output.

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CHAPTER OVERVIEW

7: Economic Growth

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7.1: Introduction to Economic Growth



Figure 7.1 Average Daily Calorie Consumption Not only has the number of calories that people consume per day increased, so has the amount of food calories that people are able to afford based on their working wages. (Credit: modification of "Daily Calorie Intake" by Lauren Manning/Flickr Creative Commons, CC BY 2.0)

Chapter Objectives

In this chapter, you will learn about:

- The Relatively Recent Arrival of Economic Growth
- Labor Productivity and Economic Growth
- Components of Economic Growth
- Economic Convergence

Bring It Home

Calories and Economic Growth

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.

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 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 7.5 billion people, about 1.1 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.

According to the British economist Angus Maddison, who devoted life's work to measuring GDP and population in the world economy, GDP per capita in 1990 international dollars was $854 per year. 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. According to the World Bank, 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 2015, South Korea is the eleventh-largest economy in the world. For a nation of 50 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 East Asian nations, like Thailand and Indonesia, have seen very rapid growth as well. China has grown enormously since it enacted market-oriented economic reforms 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 transformed from a primarily rural and agricultural economy to an economy based on services, manufacturing, and technology.

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7.2: The Relatively Recent Arrival of Economic Growth

Learning Objectives

By the end of this section, you will be able to:

- Explain the conditions that have allowed for modern economic growth in the last two centuries
- Analyze the influence of public policies on an economy's long-run economic growth

Let’s begin with a brief overview of spectacular economic growth patterns around the world in the last two centuries. We commonly refer to this as the period of modern economic growth. (Later in the chapter we will discuss lower economic growth rates and some key ingredients for economic progress.) 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 more 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 GDP growth rate per capita in the leading industrialized countries has been about 2% per year. What were times like before then? Read the following Clear It Up feature for the answer.

Clear It Up

What were economic conditions like before 1870?

Angus Maddison, a quantitative economic historian, led the most systematic inquiry into national incomes before 1870. Economists recently have refined and used his methods to compile GDP per capita estimates from year 1 C.E. to 1348. Table 7.1 is an important counterpoint to most of the narrative in this chapter. It shows that nations can decline as well as rise. 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 explain declines in income. Institutions are the traditions and laws 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. The United States in its own constitution later adopted this concept. This social order may have contributed to England’s GDP per capita in 1348, which was second to that of northern Italy.

In studying economic growth, a country’s institutional framework plays a critical role. Table 7.1 also shows relative global equality for almost 1,300 years. After this, we begin to see significant divergence in income (not in the table).

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	-	-	-	-	-

Table 7.1 GDP Per Capita Estimates in Current International Dollars from AD 1 to 1348 (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 took off 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 nearly 1.4 billion people, grew at a per capita rate 9% per year from 1984 into the 2000s and still average high rates of growth (more than 5% today). India, with a population of 1.4 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 and 2010s.

Link It Up

Visit this website to read about the Asian Development Bank.

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: 1.4 billion) and India (population: 1.3 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.*

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, as you might recall from Environmental Protection and Negative Externalities 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. Using 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 payment. Failure to pay would constitute property theft by the patient. The theft is property the services that the surgeon provided. 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 2020, the world average ranking was 2.9. The three countries with the lowest ranking of 1.0 were Somalia and Eritrea, with South Sudan at 1.5. Their GDP per capita was $875, $1,625, and $1,234.70 respectively. The World Bank also cites Afghanistan (GDP per capita $2,087.60) 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 (GDP per capita $979.60) has poor economic resources as well as political instability and is a source of children used in human trafficking. Zimbabwe (GDP per capita $2,895.40) has had declining and often negative growth for much of the period 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.

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7.3: Labor Productivity and Economic Growth

Learning Objectives

By the end of this section, you will be able to:

- Identify the role of labor productivity in promoting economic growth
- Analyze the sources of economic growth using the aggregate production function
- Measure an economy's rate of productivity growth
- Evaluate the power of sustained growth

Sustained long-term economic growth comes from increases in worker productivity, which essentially means how well we do things. In other words, how efficient is your nation with its time and workers? Labor productivity is the value that each employed person creates per unit of their input. The easiest way to comprehend 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. More productivity essentially means you can do more in the same amount of time. This in turn frees up resources for workers to use elsewhere.

What determines how productive workers are? The answer is pretty intuitive. The first determinant of labor productivity is human capital. 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.

The second factor that determines labor productivity is technological change. Technological change is a combination of invention—advances in knowledge—and innovation, which is putting those advances 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 are ubiquitous in products as varied as smart-phones, computers, and escalators. Developing the transistor has allowed workers to be anywhere with smaller devices. People can use these devices to communicate with other workers, measure product quality or do any other task in less time, improving worker productivity.

The third factor that determines labor productivity is economies of scale. Recall that economies of scale are the cost advantages that industries obtain due to size. (Read more about economies of scale in Production, Cost and Industry Structure.) Consider again the case of the fictional Canadian worker who could produce 10 loaves of bread in an hour. If this difference in productivity was due only to economies of scale, it could be that the Canadian worker had access to a large industrial-size oven while the U.S. worker was using a standard residential size oven.

Now that we have explored the determinants of worker productivity, let's turn to how economists measure economic growth and productivity.

Sources of Economic Growth: The Aggregate Production Function

To analyze the sources of economic growth, it is useful to think about a production function, which is the technical relationship by which economic inputs like labor, machinery, and raw materials are turned into outputs like goods and services that consumers use. A microeconomic production function describes a firm's or perhaps an industry's inputs and outputs. In macroeconomics, we call the connection from inputs to outputs for the entire economy an aggregate production function.

Components of the Aggregate Production Function

Economists construct different production functions depending on the focus of their studies. Figure 7.2 presents two examples of aggregate production functions. In the first production function in Figure 7.2 (a), the output is GDP. The inputs in this example are workforce, human capital, physical capital, and technology. We discuss these inputs further in the module, Components of Economic Growth.



Figure 7.2 Aggregate Production Functions An aggregate production function shows what goes into producing the output for an overall economy. (a) This aggregate production function has GDP as its output. (b) This aggregate production function has GDP per capita as its output. Because we calculate it on a per-person basis, we already figure the labor input into the other factors and we do not need to list it separately.

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 or if there are complementary increases in capital.

A common measure of U.S. productivity per worker is 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 7.3 shows an index of output per hour, with 2012 as the base year (when the index equals 100). The index equaled 110.5 in 2020. In 1977, the index equaled about 50, which shows that workers have more than doubled their productivity since then.

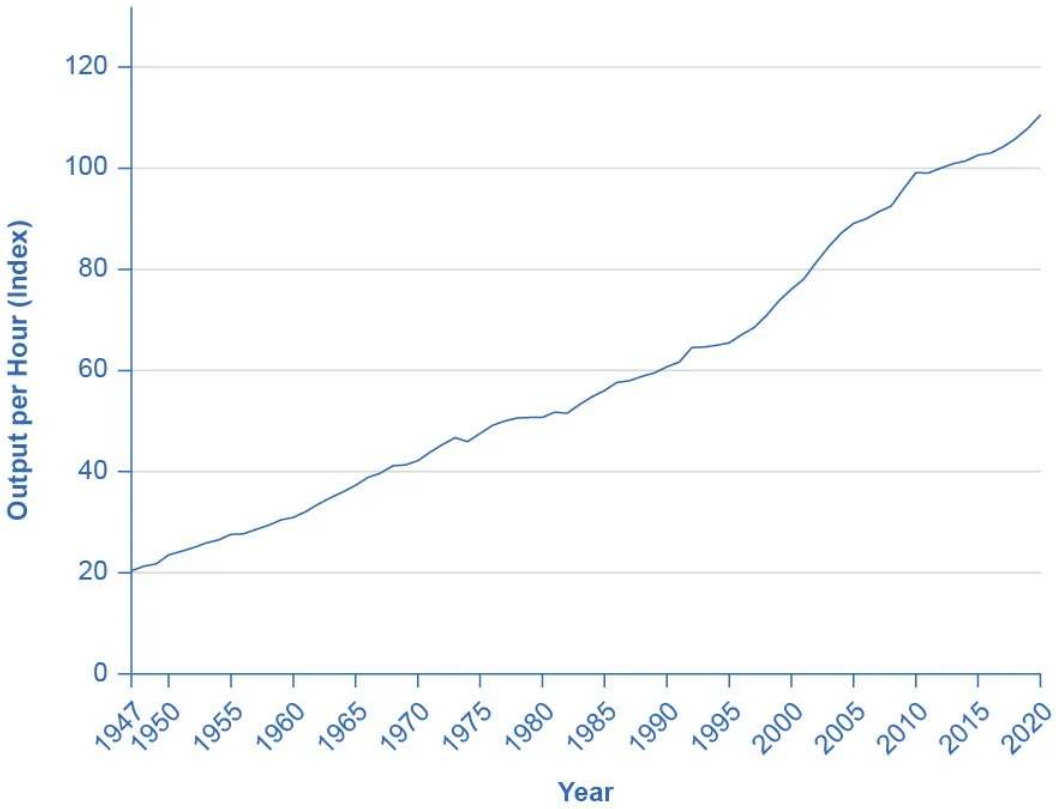


Figure 7.3 Output per Hour Worked in the U.S. Economy, 1947–2020 Output per hour worked is a measure of worker productivity. In the U.S. economy, worker productivity rose more quickly in the 1960s and the mid-1990s compared with the 1970s and 1980s. However, these growth-rate differences are only a few percentage points per year. Look carefully to see them in the changing slope of the line. The average U.S. worker produced over twice as much per hour in 2020 than they did in the 1970s. (Source: U.S. Department of Labor, Bureau of Labor Statistics.)

Click to view content

A graph has an X-axis with years progressing from 1955 to 2020 and a Y axis labeled Percent Change at Annual Rate. The graphed data moves up and down across a zero line indicating change year over year. In 1970, 1974, 1981, 1983, 2008, and 2020, the rate was quite low, as the U.S. was undergoing recessions.

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 2.8% per year from 1947 to 1973; dropped to 1.2% per year from 1973 to 1979; increased to 1.5% per year from 1979 to 1990; increased again to 2.2% from 1990 to 2000; increased even more to 2.7% from 2000 to 2007; and then decreased to 1.4% from 2007 to 2020 Figure 7.4 shows average annual rates of productivity growth averaged over time since 1947.

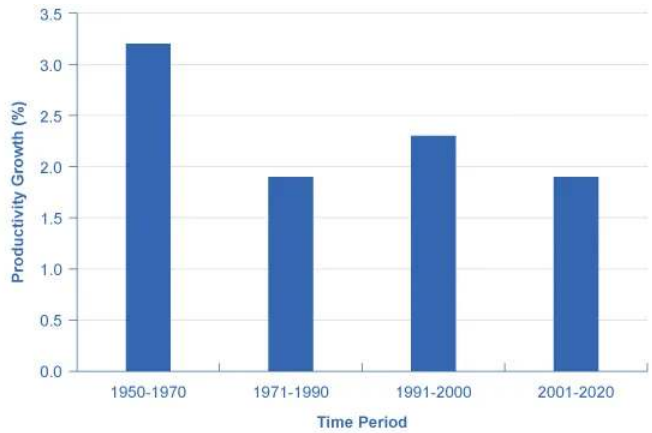


Figure 7.4 Productivity Growth Since 1947 U.S. growth in worker productivity was very high between 1947 and 1973. It then declined to lower levels in the later 1970s and the 1980s. The late 1990s and early 2000s saw productivity rebound, but then productivity sagged a bit between 2001 and 2020. Some think the productivity rebound of the late 1990s and early 2000s marks the start of a “new economy” built on higher productivity growth, but we cannot determine this until more time has passed. (Source: U.S. Department of Labor, Bureau of Labor Statistics.)

The “New Economy” Controversy

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, alternatively, 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 2008-2009 recession, with its sharp but not completely synchronized declines in output and employment, complicates any interpretation. While productivity growth was high in 2009 and 2010 (around 3%), it has slowed down over the last decade.

Productivity growth is also 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. To learn how to compare economies in this regard, follow the steps in the following Work It Out feature.

Work It Out

Comparing the Economies of Two Countries

The Organization for Economic Co-operation and Development (OECD) tracks data on the annual growth rate of real GDP per hour worked. You can find these data on the OECD data webpage “Growth in GDP per capita, productivity and ULC” at this website.

Step 1. Visit the OECD website given above and select two countries to compare.

Step 2. On the drop-down menu “Subject,” select “ GDP per capita, constant prices,” and under “Measure,” select “Annual growth/change.” Then record the data for the countries you have chosen for the five most recent years.

Step 3. Go back to the drop-down “Subject” menu and select “GDP per hour worked, constant prices,” and under “Measure” again select “Annual growth/change.” Select data for the same years for which you selected GDP per capita data.

Step 4. Compare real GDP growth for both countries. Table 7.2 provides an example of a comparison between Australia and Belgium.

Australia	**2011**	**2012**	**2013**	**2014**	**2015**
Real GDP/Capita Growth (%)	2.3%	1.5%	1.3%	1.4	0.1%
Real GDP Growth/Hours Worked (%)	1.7%	−0.1%	1.4%	2.2%	−0.2%
Belgium	**2011**	**2012**	**2013**	**2014**	**2015**
Real GDP/Capita Growth (%)	0.9	−0.6	−0.5	1.2	1.0
Real GDP Growth/Hours Worked (%)	−0.5	−0.3	0.4	1.4	0.9

Table 7.2

Step 5. For both measures, growth in Australia is greater than growth in Belgium for the first four years. In addition, there are year-to-year fluctuations. Many factors can affect growth. For example, one factor that may have contributed to Australia's stronger

growth may be its larger inflows of immigrants, who generally contribute to economic growth.

The Power of Sustained Economic Growth

Nothing is more important for 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 7.3, 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:

GDP at starting date × (1 + growth rate of GDP)years = GDP at end dateGDP at starting date × (1 + growth rate of GDP)years = 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, $100\ (1.03)^{25} = 209$.

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 7.3 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. (See the following Clear It Up feature on the relationship between compound growth rates and compound interest rates.) 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 more than sixfold by the time they reach age 45.

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	339	1,147
8%	216	685	4,690

Table 7.3 Growth of GDP over Different Time Horizons

Clear It Up

How are compound growth rates and compound interest rates related?

The formula for GDP growth rates over different periods of time, as Figure 7.3 shows, is exactly the same as the formula for how a given amount of financial savings grows at a certain interest rate over time, as presented in Choice in a World of Scarcity. 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 GDP growth rate 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 we multiply the rate of growth by a base that includes past GDP growth, with dramatic effects over time.

For example, in 2020, the Central Intelligence Agency's World Fact Book reported that South Korea had a GDP of $2.2 trillion. With a growth rate of 2.8% per year, South Korea's GDP will be $2.5 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 $2.3 trillion. In year two, we start with the end-of-year one value of $1.72 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 Table 7.4 depicts.

Year	Starting GDP	Growth Rate 2.8%	Year-End Amount
1	$2.2 Trillion ×	(1+0.028)	$2.3 Trillion
2	$2.3 Trillion ×	(1+0.028)	$2.3 Trillion
3	$2.3 Trillion ×	(1+0.028)	$2.4 Trillion
4	$2.4 Trillion ×	(1+0.028)	$2.5 Trillion
5	$2.5 Trillion ×	(1+0.028)	$2.5 Trillion

Table 7.4

Another way to calculate the growth rate is to apply the following formula:

Future Value = Present Value × (1 + g)nFuture Value = Present Value × (1 + g)n

Where "future value" is the value of GDP five years hence, "present value" is the starting GDP amount of $1.67 trillion, "g" is the growth rate of 2.8%, and "n" is the number of periods for which we are calculating growth.

Future Value = 1.67 × (1+0.028)5 = $1.92 trillion Future Value = 1.67 × (1+0.028)5 = $1.92 trillion

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7.4: Components of Economic Growth

Learning Objectives

By the end of this section, you will be able to:

- Discuss the components of economic growth, including physical capital, human capital, and technology
- Explain capital deepening and its significance
- Analyze the methods employed in economic growth accounting studies
- Identify factors that contribute to a healthy climate for economic growth

Over decades and generations, seemingly small differences of a few percentage points in the annual rate of economic growth make an enormous difference in GDP per capita. In this module, we discuss some of the components of economic growth, including physical capital, human capital, and technology.

The category of physical capital includes the plant and equipment that firms use as well as things like roads (also called infrastructure). 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 refers to the skills and knowledge that make workers productive. Human capital and physical capital accumulation are similar: In both cases, investment now pays off in higher productivity in the future.

The category of technology is the "joker in the deck." Earlier we described it as the combination of invention and innovation. 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, developing 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.

It may not make sense to compare the GDPs of China and say, Benin, simply because of the great difference in population size. To understand economic growth, which is really concerned with the growth in living standards of an average person, it is often useful to focus on GDP per capita. Using GDP per capita also makes it easier to compare countries with smaller numbers of people, like Belgium, Uruguay, or Zimbabwe, with countries that have larger populations, like the United States, the Russian Federation, or Nigeria.

To obtain a per capita production function, divide each input in Figure 7.2(a) by the population. This creates a second aggregate production function where the output is GDP per capita (that is, GDP divided by 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—see Figure 7.2(b). The result of having population in the denominator is mathematically appealing. Increases in population lower per capita income. However, increasing population is important for the average person only if the rate of income growth exceeds population growth. A more important reason for constructing a per capita production function is to understand the contribution of human and physical capital.

Capital Deepening

When society increases the level of capital per person, we call the result 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 7.5 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.

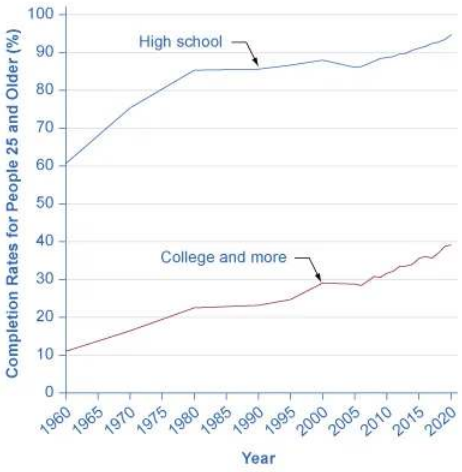


Figure 7.5 Human Capital Deepening in the U.S. Rising levels of education for persons 25 and older show the deepening of human capital in the U.S. economy. Even today, under one-third of U.S. adults have completed a four-year college degree. There is clearly room for additional deepening of human capital to occur. (Source: Penn World Tables, 10.0 https://www.rug.nl/ggdc/productivity/pwt/?lang=en)

Figure 7.6 shows physical capital deepening in the U.S. economy. 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.

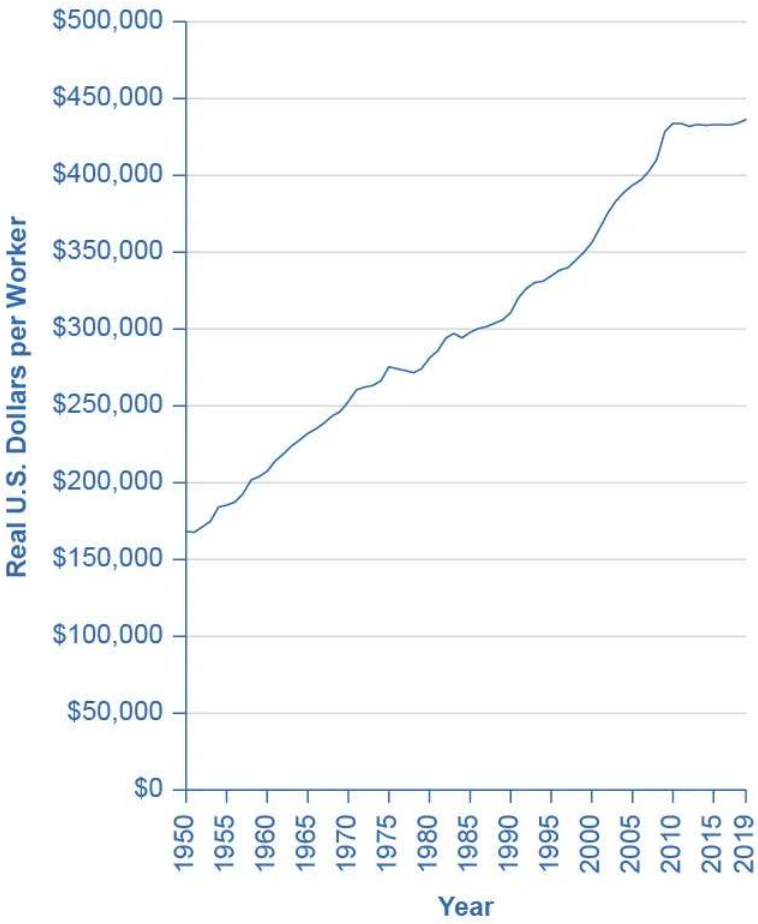


Figure 7.6 Physical Capital per Worker in the United States The value of the physical capital, measured by plant and equipment, used by the average worker in the U.S. economy has risen over the decades. The increase may have leveled off a bit in the 1970s

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. South Korea, for example, already achieved universal enrollment in primary school (the equivalent of kindergarten through sixth grade in the United States) 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 obtain 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.

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. We can measure these two inputs 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 and 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 Clear It Up feature for an example of how human capital, physical capital, and technology can combine to significantly impact lives.

Clear It Up

How do girls' education and economic growth relate in low-income countries?

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 Afghanistan, for example, the literacy rate for those aged 15-24 for the period 2005-

2014 was 62% for males and only 32% for females. In Benin, in West Africa, it was 55% for males and 31% for females. In Nigeria, Africa's most populous country, it was 76% for males and 58 percent for females.

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 obtain one additional year of schooling, as a group they will, on average, have one less child. When 1,000 women obtain 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.

A Healthy Climate for 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.

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 government's role 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, the government taxes gains from private investment. 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. We explore them in other chapters and in particular in Macroeconomic Policy Around the World. 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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7.5: Economic Convergence

Learning Objectives

By the end of this section, you will be able to:

- Explain economic convergence
- Analyze various arguments for and against economic convergence
- Evaluate the speed of economic convergence between high-income countries and the rest of the world

Some low-income and middle-income economies around the world have shown a pattern of convergence, in which their economies grow faster than those of high-income countries. GDP increased by an average rate of 2.7% per year in the 1990s and 1.7% per year from 2010 to 2019 in the high-income countries of the world, which include the United States, Canada, the European Union countries, Japan, Australia, and New Zealand.

Table 7.5 lists eight countries that belong to an informal “fast growth club.” These countries averaged GDP growth (after adjusting for inflation) of at least 5% per year in both the time periods from 1990 to 2000 and from 2010 to 2019. Since economic growth in these countries has exceeded the average of the world’s high-income economies, these countries may converge with the high-income countries. The second part of Table 7.5 lists the “slow growth club,” which consists of countries that averaged GDP growth of 2% per year or less (after adjusting for inflation) during the same time periods. The final portion of Table 7.5 shows GDP growth rates for the countries of the world divided by income.

Country	Average Growth Rate of Real GDP 1990–2000	Growth Rate of Real GDP 2010–2019
Fast Growth Club (5% or more per year in both time periods)		
Cambodia	7.1%	7.0%
China	10.6%	7.3%
India	6.0%	6.7%
Ireland	7.5%	6.3%
Laos	6.5%	7.3%
Mozambique	6.4%	5.6%
Uganda	7.1%	5.4%
Vietnam	7.9%	6.3%
Slow Growth Club (2% or less per year in both time periods)		
Central African Republic	2.0%	–0.2%
France	2.0%	1.4%
Germany	1.8%	2.0%
Haiti	–1.5%	1.5%
Italy	1.6%	0.3%
Jamaica	0.9%	0.7%
Japan	1.3%	1.3%
Switzerland	1.0%	2.0%
United States (for reference)	3.2%	2.3%
World Overview		
High income	2.7%	1.7%
Low income	3.8%	4.5%
Middle income	4.7%	4.0%

Table 7.5 Economic Growth around the World (Source: http://databank.worldbank.org/data/v...indicators#c_u)

Each of the countries in Table 7.5 has its own unique story of investments in human and physical capital, technological gains, market forces, government policies, and even lucky events, but an overall pattern of convergence is clear. The low-income countries have GDP growth that is faster than that of the middle-income countries, which in turn have GDP growth that is faster than that of the high-income countries. Two prominent members of the fast-growth club are China and India, which between them have nearly 40% of the world's population. Some prominent members of the slow-growth club are high-income countries like France, Germany, Italy, and Japan.

Will this pattern of economic convergence persist into the future? This is a controversial question among economists that we will consider by looking at some of the main arguments on both sides.

Arguments Favoring Convergence

Several arguments suggest that low-income countries might have an advantage in achieving greater worker productivity and economic growth in the future.

A first argument is based on diminishing marginal returns. Even though deepening human and physical capital will tend to increase GDP per capita, the law of diminishing returns suggests that as an economy continues to increase its human and physical capital, the marginal gains to economic growth will diminish. For example, raising the average education level of the population by two years from a tenth-grade level to a high school diploma (while holding all other inputs constant) would produce a certain increase in output. An additional two-year increase, so that the average person had a two-year college degree, would increase output further, but the marginal gain would be smaller. Yet another additional two-year increase in the level of education, so that the average person would have a four-year-college bachelor's degree, would increase output still further, but the marginal increase would again be smaller. A similar lesson holds for physical capital. If the quantity of physical capital available to the average worker increases, by, say, $5,000 to $10,000 (again, while holding all other inputs constant), it will increase the level of output. An additional increase from $10,000 to $15,000 will increase output further, but the marginal increase will be smaller.

Low-income countries like China and India tend to have lower levels of human capital and physical capital, so an investment in capital deepening should have a larger marginal effect in these countries than in high-income countries, where levels of human and physical capital are already relatively high. Diminishing returns implies that low-income economies could converge to the levels that the high-income countries achieve.

A second argument is that low-income countries may find it easier to improve their technologies than high-income countries. High-income countries must continually invent new technologies, whereas low-income countries can often find ways of applying technology that has already been invented and is well understood. The economist Alexander Gerschenkron (1904–1978) gave this phenomenon a memorable name: "the advantages of backwardness." Of course, he did not literally mean that it is an advantage to have a lower standard of living. He was pointing out that a country that is behind has some extra potential for catching up.

Finally, optimists argue that many countries have observed the experience of those that have grown more quickly and have learned from it. Moreover, once the people of a country begin to enjoy the benefits of a higher standard of living, they may be more likely to build and support the market-friendly institutions that will help provide this standard of living.

Link It Up

View this video to learn about economic growth across the world.

Arguments That Convergence Is neither Inevitable nor Likely

If the economy's growth depended only on the deepening of human capital and physical capital, then we would expect that economy's growth rate to slow down over the long run because of diminishing marginal returns. However, there is another crucial factor in the aggregate production function: technology.

Developing new technology can provide a way for an economy to sidestep the diminishing marginal returns of capital deepening. Figure 7.7 shows how. The figure's horizontal axis measures the amount of capital deepening, which on this figure is an overall measure that includes deepening of both physical and human capital. The amount of human and physical capital per worker increases as you move from left to right, from C_1 to C_2 to C_3. The diagram's vertical axis measures per capita output. Start by considering the lowest line in this diagram, labeled Technology 1. Along this aggregate production function, the level of technology is held constant, so the line shows only the relationship between capital deepening and output. As capital deepens from C_1 to C_2 to C_3 and the economy moves from R to U to W, per capita output does increase—but the way in which the line starts out steeper on the left but then flattens as it moves to the right shows the diminishing marginal returns, as additional marginal amounts of capital deepening increase output by ever-smaller amounts. The shape of the aggregate production line (Technology 1) shows that the ability of capital deepening, by itself, to generate sustained economic growth is limited, since diminishing returns will eventually set in.

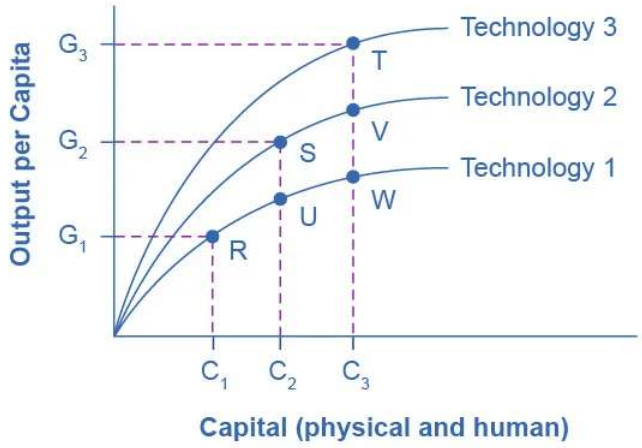


Figure 7.7 Capital Deepening and New Technology Imagine that the economy starts at point R, with the level of physical and human capital C_1 and the output per capita at G_1. If the economy relies only on capital deepening, while remaining at the technology level shown by the Technology 1 line, then it would face diminishing marginal returns as it moved from point R to point U to point W. However, now imagine that capital deepening is combined with improvements in technology. Then, as capital deepens from C_1 to C_2, technology improves from Technology 1 to Technology 2, and the economy moves from R to S. Similarly, as capital deepens from C_2 to C_3, technology increases from Technology 2 to Technology 3, and the economy moves from S to T. With improvements in technology, there is no longer any reason that economic growth must necessarily slow down.

Now, bring improvements in technology into the picture. Improved technology means that with a given set of inputs, more output is possible. The production function labeled Technology 1 in the figure is based on one level of technology, but Technology 2 is based on an improved level of technology, so for every level of capital deepening on the horizontal axis, it produces a higher level of output on the vertical axis. In turn, production function Technology 3 represents a still higher level of technology, so that for every level of inputs on the horizontal axis, it produces a higher level of output on the vertical axis than either of the other two aggregate production functions.

Most healthy, growing economies are deepening their human and physical capital and increasing technology at the same time. As a result, the economy can move from a choice like point R on the Technology 1 aggregate production line to a point like S on Technology 2 and a point like T on the still higher aggregate production line (Technology 3). With the combination of technology and capital deepening, the rise in GDP per capita in high-income countries does not need to fade away because of diminishing returns. The gains from technology can offset the diminishing returns involved with capital deepening.

Will technological improvements themselves run into diminishing returns over time? That is, will it become continually harder and more costly to discover new technological improvements? Perhaps someday, but, at least over the last two centuries since the beginning of the Industrial Revolution, improvements in technology have not run into diminishing marginal returns. Modern inventions, like the internet or discoveries in genetics or materials science, do not seem to provide smaller gains to output than earlier inventions like the steam engine or the railroad. One reason that technological ideas do not seem to run into diminishing returns is that we often can apply widely the ideas of new technology at a marginal cost that is very low or even zero. A specific worker or group of workers must use a specific additional machine, or an additional year of education. Many workers across the economy can use a new technology or invention at very low marginal cost.

The argument that it is easier for a low-income country to copy and adapt existing technology than it is for a high-income country to invent new technology is not necessarily true, either. When it comes to adapting and using new technology, a society's performance is not necessarily guaranteed, but is the result of whether the country's economic, educational, and public policy institutions are supportive. In theory, perhaps, low-income countries have many opportunities to copy and adapt technology, but if they lack the appropriate supportive economic infrastructure and institutions, the theoretical possibility that backwardness might have certain advantages is of little practical relevance.

Link It Up

Visit this website to read more about economic growth in India.

The Slowness of Convergence

Although economic convergence between the high-income countries and the rest of the world seems possible and even likely, it will proceed slowly. Consider, for example, a country that starts off with a GDP per capita of $40,000, which would roughly represent a typical high-income country today, and another country that starts out at $4,000, which is roughly the level in low-income but not impoverished countries like Indonesia, Guatemala, or Egypt. Say that the rich country chugs along at a 2% annual growth rate of GDP per capita, while the poorer country grows at the aggressive rate of 7% per year. After 30 years, GDP per capita in the rich country will be $72,450 (that is, $40,000 $(1 + 0.02)^{30}$) while in the poor country it will be $30,450 (that is, $4,000 $(1 + 0.07)^{30}$). Convergence has occurred. The rich country used to be 10 times as wealthy as the poor one, and now it is only about 2.4 times as wealthy. Even after 30 consecutive years of very rapid growth, however, people in the low-income country are still likely to feel quite poor compared to people in the rich country. Moreover, as the poor country catches up, its opportunities for catch-up growth are reduced, and its growth rate may slow down somewhat.

The slowness of convergence illustrates again that small differences in annual rates of economic growth become huge differences over time. The high-income countries have been building up their advantage in standard of living over decades—more than a century in some cases. Even in an optimistic scenario, it will take decades for the low-income countries of the world to catch up significantly.

Bring It Home

Calories and Economic Growth

We can tell the story of modern economic growth by looking at calorie consumption over time. The dramatic rise in incomes allowed the average person to eat better and consume more calories. How did these incomes increase? The neoclassical growth consensus uses the aggregate production function to suggest that the period of modern economic growth came about because of increases in inputs such as technology and physical and human capital. Also important was the way in which technological progress combined with physical and human capital deepening to create growth and convergence. The issue of distribution of income notwithstanding, it is clear that the average worker can afford more calories in 2020 than in 1875.

Aside from increases in income, there is another reason why the average person can afford more food. Modern agriculture has allowed many countries to produce more food than they need. Despite having more than enough food, however, many governments and multilateral agencies have not solved the food distribution problem. In fact, food shortages, famine, or general food insecurity are caused more often by the failure of government macroeconomic policy, according to the Nobel Prize-winning economist Amartya Sen. Sen has conducted extensive research into issues of inequality, poverty, and the role of government in improving standards of living. Macroeconomic policies that strive toward stable inflation, full employment, education of women, and preservation of property rights are more likely to eliminate starvation and provide for a more even distribution of food.

Because we have more food per capita, global food prices have decreased since 1875. The prices of some foods, however, have decreased more than the prices of others. For example, researchers from the University of Washington have shown that in the United States, calories from zucchini and lettuce are 100 times more expensive than calories from oil, butter, and sugar. Research from countries like India, China, and the United States suggests that as incomes rise, individuals want more calories from fats and protein and fewer from carbohydrates. This has very interesting implications for global food production, obesity, and environmental consequences. Affluent urban India has an obesity problem much like many parts of the United States. The forces of convergence are at work.

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7.6: Key Terms

aggregate production function
the process whereby an economy as a whole turns economic inputs such as human capital, physical capital, and technology into output measured as GDP per capita

capital deepening
an increase by society in the average level of physical and/or human capital per person

compound growth rate
the rate of growth when multiplied by a base that includes past GDP growth

contractual rights
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

convergence
pattern in which economies with low per capita incomes grow faster than economies with high per capita incomes

human capital
the accumulated skills and education of workers

Industrial Revolution
the widespread use of power-driven machinery and the economic and social changes that occurred in the first half of the 1800s

infrastructure
a component of physical capital such as roads and rail systems

innovation
putting advances in knowledge to use in a new product or service

invention
advances in knowledge

labor productivity
the value of what is produced per worker, or per hour worked (sometimes called worker productivity)

modern economic growth
the period of rapid economic growth from 1870 onward

physical capital
the plant and equipment that firms use in production; this includes infrastructure

production function
the process whereby a firm turns economic inputs like labor, machinery, and raw materials into outputs like goods and services that consumers use

rule of law
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

special economic zone (SEZ)
area of a country, usually with access to a port where, among other benefits, the government does not tax trade

technological change

a combination of invention—advances in knowledge—and innovation

technology

all the ways in which existing inputs produce more or higher quality, as well as different and altogether new products

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7.7: Key Concepts and Summary

7.1 The Relatively Recent Arrival of Economic Growth

Since the early nineteenth century, there has been a spectacular process of long-run economic growth during which the world's leading economies—mostly those in Western Europe and North America—expanded GDP per capita at an average rate of about 2% per year. In the last half-century, countries like Japan, South Korea, and China have shown the potential to catch up. The Industrial Revolution facilitated the extensive process of economic growth, that economists often refer to as modern economic growth. This increased worker productivity and trade, as well as the development of governance and market institutions.

7.2 Labor Productivity and Economic Growth

We can measure productivity, the value of what is produced per worker, or per hour worked, as the level of GDP per worker or GDP per hour. The United States experienced a productivity slowdown between 1973 and 1989. Since then, U.S. productivity has rebounded for the most part, but annual growth in productivity in the nonfarm business sector has been less than one percent each year between 2011 and 2016. It is not clear what productivity growth will be in the coming years. The rate of productivity growth is the primary determinant of an economy's rate of long-term economic growth and higher wages. Over decades and generations, seemingly small differences of a few percentage points in the annual rate of economic growth make an enormous difference in GDP per capita. An aggregate production function specifies how certain inputs in the economy, like human capital, physical capital, and technology, lead to the output measured as GDP per capita.

Compound interest and compound growth rates behave in the same way as productivity rates. Seemingly small changes in percentage points can have big impacts on income over time.

7.3 Components of Economic Growth

Over decades and generations, seemingly small differences of a few percentage points in the annual rate of economic growth make an enormous difference in GDP per capita. Capital deepening refers to an increase in the amount of capital per worker, either human capital per worker, in the form of higher education or skills, or physical capital per worker. Technology, in its economic meaning, refers broadly to all new methods of production, which includes major scientific inventions but also small inventions and even better forms of management or other types of institutions. A healthy climate for growth in GDP per capita consists of improvements in human capital, physical capital, and technology, in a market-oriented environment with supportive public policies and institutions.

7.4 Economic Convergence

When countries with lower GDP levels per capita catch up to countries with higher GDP levels per capita, we call the process convergence. Convergence can occur even when both high- and low-income countries increase investment in physical and human capital with the objective of growing GDP. This is because the impact of new investment in physical and human capital on a low-income country may result in huge gains as new skills or equipment combine with the labor force. In higher-income countries, however, a level of investment equal to that of the low income country is not likely to have as big an impact, because the more developed country most likely already has high levels of capital investment. Therefore, the marginal gain from this additional investment tends to be successively less and less. Higher income countries are more likely to have diminishing returns to their investments and must continually invent new technologies. This allows lower-income economies to have a chance for convergent growth. However, many high-income economies have developed economic and political institutions that provide a healthy economic climate for an ongoing stream of technological innovations. Continuous technological innovation can counterbalance diminishing returns to investments in human and physical capital.

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CHAPTER OVERVIEW

8: Inflation

8.1: Introduction to Inflation
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8.3: How to Measure Changes in the Cost of Living
8.4: How the U.S. and Other Countries Experience Inflation
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8.1: Introduction to Inflation



Figure 9.1 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. At one point, 621,984,228 Zimbabwean dollars were equal to one U.S. dollar. Eventually, the country abandoned its own currency and allowed people to use foreign currency for purchases. (Credit: modification of "100 Billion Dollars" by Peat Bakke/Flickr, CC BY 2.0)

Chapter Objectives

In this chapter, you will learn about:

- Tracking Inflation
- How to Measure Changes in the Cost of Living
- How the U.S. and Other Countries Experience Inflation
- The Confusion Over Inflation
- Indexing and Its Limitations

Bring It Home

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. However, 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 2008, Zimbabwe had an inflation rate of 79.6 billion percent. In contrast, in 2014, the United States had an average annual rate of inflation of 1.6%.

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? Most of you reading this will have never experienced this phenomenon. The government adjusted prices for commodities in Zimbabwean dollars 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' salaries were 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 people to use foreign currencies for purchases.

> 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 is a general and ongoing rise in the level of prices in an entire economy. Inflation does not refer to a change in relative prices. A relative price change occurs when you see that the price of tuition has risen, but the price of laptops has fallen. Inflation, on the other hand, means that there is pressure for prices to rise in most markets in the economy. In addition, price increases in the supply-and-demand model were one-time events, representing a shift from a previous equilibrium to a new one. Inflation implies an ongoing rise in prices. If inflation happened for one year and then stopped, then it would not be inflation any more.

This chapter begins by showing how to combine prices of individual goods and services to create a measure of overall inflation. It discusses the historical and recent experience of inflation, both in the United States and in other countries around the world. Other chapters have sometimes included a note under an exhibit or a parenthetical reminder in the text saying that the numbers have been adjusted for inflation. In this chapter, it is time to show how to use inflation statistics to adjust other economic variables, so that you can tell how much of, for example, we can attribute the rise in GDP over different periods of time to an actual increase in the production of goods and services and how much we should attribute to the fact that prices for most items have risen.

Inflation has consequences for people and firms throughout the economy, in their roles as lenders and borrowers, wage-earners, taxpayers, and consumers. The chapter concludes with a discussion of some imperfections and biases in the inflation statistics, and a preview of policies for fighting inflation that we will discuss in other chapters.

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8.2: Tracking Inflation

Learning Objectives

By the end of this section, you will be able to:

- Calculate the annual rate of inflation
- Explain and use index numbers and base years when simplifying the total quantity spent over a year for products
- Calculate inflation rates using index numbers

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 9.1 compares some prices of common goods in 1970 and 2017. Of course, the average prices 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, certain products have evolved over recent decades. A new car in 2021, 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. 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 9.1—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. At the beginning of 2021, $1 had about the same purchasing power in overall terms of goods and services as 15 cents did in 1972, because of the amount of inflation that has occurred over that time period.

Items	1970	2021
Pound of ground beef	$0.66	$5.96
Pound of butter	$0.87	$3.50
Movie ticket	$1.55	$13.70
Sales price of new home (median)	$22,000	$408,800
New car	$3,000	$42,000
Gallon of gasoline	$0.36	$3.32
Average hourly wage for a manufacturing worker	$3.23	$30.11
Per capita GDP	$5,069	$63,543

Table 9.1 Price Comparisons, 1970 and 2021 (Sources: See chapter References at end of book.)

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 9.1 shows that the average hourly wage for a manufacturing worker increased nearly ten-fold from 1970 to 2021. The average worker in 2021 is better educated and more productive than the average worker in 1970—but not six times more productive. Per capita GDP increased substantially from 1970 to 2021, but is the average person in the U.S. economy really more than twelve times better off in just 51 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 attribute to a single inflation rate? As with many problems in economic measurement, the conceptual answer is reasonably straightforward: Economists combine prices of a variety of goods and services into a single price level. The inflation rate is simply the percentage change in the price level. Applying the concept, however, involves some practical difficulties.

The Price of a Basket of Goods

To calculate the price level, economists begin with the concept of a basket of goods and services, consisting of the different items individuals, businesses, or organizations typically buy. The next step is to look at how the prices of those items change over time. In thinking about how to combine individual prices into an overall price level, many people find that their first impulse is to calculate the average of the prices. Such a calculation, however, could easily be misleading because some products matter more than others.

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. The following Work It Out feature walks you through the steps of calculating the annual rate of inflation based on a few products.

Work It Out

Calculating an Annual Rate of Inflation

Consider the simple basket of goods with only three items, represented in Table 9.2. Say that in any given month, a college student spends money on 20 hamburgers, one bottle of aspirin, and five movies. The table provides prices for these items over four years through each time period (Pd). 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. The table shows the cost of buying the given basket of goods at the prices prevailing at that time.

Items	Hamburger	Aspirin	Movies	Total	Inflation Rate
Qty	20	1 bottle	5	-	-
(Pd 1) Price	$3.00	$10.00	$6.00	-	-
(Pd 1) Amount Spent	$60.00	$10.00	$30.00	$100.00	-
(Pd 2) Price	$3.20	$10.00	$6.50	-	-
(Pd 2) Amount Spent	$64.00	$10.00	$32.50	$106.50	6.5%
(Pd 3) Price	$3.10	$10.00	$7.00	-	-
(Pd 3) Amount Spent	$62.00	$10.00	$35.00	$107.00	0.5%
(Pd 4) Price	$3.50	$10.00	$7.50	-	-
(Pd 4) Amount Spent	$70.00	$10.00	$37.50	$117.50	9.8%

Table 9.2 A College Student’s Basket of Goods

To calculate the annual rate of inflation in this example:

Step 1. Find the percentage change in the cost of purchasing the overall basket of goods between the time periods. The general equation for percentage changes between two years, whether in the context of inflation or in any other calculation, is:

Level in new year – Level in previous yearLevel in previous year x 100 = Percentage changeLevel in new year – Level in previous yearLevel in previous year x 100 = Percentage change

Step 2. From period 1 to period 2, the total cost of purchasing the basket of goods in Table 9.2 rises from $100 to $106.50. Therefore, the percentage change over this time—the inflation rate—is:

106.50 – 100100.0 = 0.065 = 6.5%106.50 – 100100.0 = 0.065 = 6.5%

Step 3. 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, again calculated by the percentage change, is approximately:

107 – 106.50106.50 = 0.0047 = 0.47%107 – 106.50106.50 = 0.0047 = 0.47%

Step 4. From period 3 to period 4, the overall cost rises from $107 to $117.50. The inflation rate is thus:

117.50 – 107107 = 0.098 = 9.8%117.50 – 107107 = 0.098 = 9.8%

This calculation of the change in the total cost of purchasing a basket of goods accounts for how much a student spends on each good. Hamburgers are the lowest-priced good in this example, and aspirin is the highest-priced. If an individual buys a greater quantity of a low-price good, then it makes sense that changes in the price of that good should have a larger impact on the buying power of that person's money. The larger impact of hamburgers shows up in the "amount spent" row, where, in all time periods, hamburgers are the largest item within the amount spent row.

Index Numbers

The numerical results of a calculation based on a basket of goods can get a little messy. The simplified example in Table 9.2 has only three goods and the prices are in even dollars, not numbers like 79 cents or $124.99. If the list of products were much longer, and we used more realistic prices, the total quantity spent over a year might be some messy-looking number like $17,147.51 or $27,654.92.

To simplify the task of interpreting the price levels for more realistic and complex baskets of goods, economists typically report the price level in each period as an index number, rather than as the dollar amount for buying the basket of goods. Economists create price indices to calculate an overall average change in relative prices over time. To convert the money spent on the basket to an index number, 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 number equal to 100. This sounds complicated, but it is really a simple math trick. In the example above, say that we choose time period 3 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. 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 index number 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 index numbers have no units.

Table 9.3 shows calculations for the other values of the index number, based on the example in Table 9.2. Because we calculate the index numbers so that they are in exactly the same proportion as the total dollar cost of purchasing the basket of goods, we can calculate the inflation rate based on the index numbers, using the percentage change formula. Thus, the inflation rate from period 1 to period 2 would be

99.5 – 93.493.4 = 0.065 = 6.5%99.5 – 93.493.4 = 0.065 = 6.5%

This is the same answer that we derived when measuring inflation based on the dollar cost of the basket of goods for the same time period.

	Total Spending	Index Number	Inflation Rate Since Previous Period
Period 1	$100	1001.07 = 93.41001.07 = 93.4	
Period 2	$106.50	106.501.07 = 99.5106.501.07 = 99.5	99.5 – 93.493.4 = 0.065 = 6.5%99.5 – 93.493.4 = 0.065 = 6.5%
Period 3	$107	1071.07 = 100.01071.07 = 100.0	100 – 99.599.5 = 0.005 = 0.5%100 – 99.599.5 = 0.005 = 0.5%
Period 4	$117.50	117.501.07 = 109.8117.501.07 = 109.8	109.8 – 100100 = 0.098 = 9.8%109.8 – 100100 = 0.098 = 9.8%

Table 9.3 Calculating Index Numbers When Period 3 is the Base Year

If the inflation rate is the same whether it is based on dollar values or index numbers, then why bother with the index numbers? The advantage is that indexing allows easier eyeballing of the inflation numbers. If you glance at two index numbers 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 we express the price levels in absolute dollars of a large basket of goods, so that when you looked at the data, the numbers were $19,493.62 and $20,040.17. 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 absolute 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 Clear It Up feature.

Clear It Up

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. We calculate the precise inflation rate as the price index moves from 107 to 110 as 100 x (110 – 107) / 107 = 100 x 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.

Two final points about index numbers are worth remembering. First, index numbers have no dollar signs or other units attached to them. Although we can use index numbers to calculate a percentage inflation rate, the index numbers themselves do not have percentage signs. Index numbers just mirror the proportions that we find in other data. They transform the other data so that it is easier to work with the data.

Second, the choice of a base year for the index number—that is, the year that is automatically set equal to 100—is arbitrary. We choose it as a starting point from which we can track changes in prices. 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. However, any base year that we choose for the index numbers will result in exactly the same inflation rate. To see this in the previous example, imagine that period 1 is the base year when total spending was $100, and we assign it an index number of 100. At a glance, you can see that the index numbers would now exactly match the dollar figures, and the inflation rate in the first period would be 6.5%.

Now that we see how indexes work to track inflation, the next module will show us how economists measure the cost of living.

Link It Up

Watch this video from the cartoon *Duck Tales* to view a mini-lesson on inflation.

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8.3: How to Measure Changes in the Cost of Living

Learning Objectives

By the end of this section, you will be able to:

- Use the Consumer Price Index (CPI) to calculate U.S. inflation rates
- Identify several ways the Bureau of Labor Statistics avoids biases in the Consumer Price Index (CPI)
- Differentiate among the Consumer Price Index (CPI), the Producer Price Index (PPI), the International Price Index, the Employment Cost Index, and the GDP deflator.

The most commonly cited measure of inflation in the United States is the Consumer Price Index (CPI). Government statisticians at the U.S. Bureau of Labor Statistics calculate the CPI based on the prices in a fixed basket of goods and services that represents the purchases of the average family of four. 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 their 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 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 reflects a higher quality (or at least different) product. 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 computing the Consumer Price Index, must deal with these difficulties in adjusting for quality changes.

Link It Up

Visit this website to view a list of Ford car prices between 1909 and 1927. Consider how these prices compare to today's models. Is the product today of a different quality?

We can think of a new product 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 in the Consumer Price Index (CPI) is revised and updated over time, and so new products are gradually included. However, 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 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 account for how improvements in the quality of existing goods or the invention of new goods improves the standard of living. The following Clear It Up feature is a must-read on how statisticians comprise and calculate the CPI.

Clear It Up

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. We do this by using the Consumer Expenditure Survey, a national survey of about 7,000 households, which provides detailed information on spending habits. Statisticians divide consumer expenditures into eight major groups (seen below), which in turn they divide into more than 200 individual item categories. The BLS currently uses 1982–1984 as the base period.

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. 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 BLS statistically selects specific products and sizes and stores 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. Statisticians rotate about one-quarter of these 80,000 specific products of the sample each year, and replace them 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. The BLS also conducts a survey of 50,000 landlords or tenants to collect information about rents.

Statisticians then calculate the Consumer Price Index by taking the 80,000 prices of individual products and combining them, using weights (see Figure 9.2) 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 statisticians combine the price indices for the 200 items into an overall Consumer Price Index. According the Consumer Price Index website, there are eight categories that data collectors use:

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)

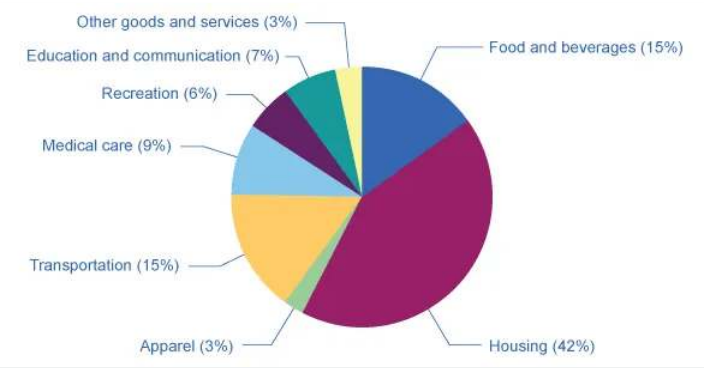


Figure 9.2 The Weighting of CPI Components Of the eight categories used to generate the Consumer Price Index, housing is the highest at 42.4%. The next highest category, food and beverage at 15.1%, is less than half the size of housing. Other goods and services, and apparel, are the lowest at 3.2% and 2.7%, respectively. (Source: www.bls.gov/cpi)

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 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 firm's production, 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. Economists typically calculate a core inflation index 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 by 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 the Federal Reserve does not need to respond to every inflationary shock 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.

Practical Solutions for the Substitution and the 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 it could include new and improved goods 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 product characteristics, and then calculate the change in price after accounting for these product changes. However, 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 we calculate the inflation rate 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.

Additional Price Indices: PPI, GDP Deflator, and More

The basket of goods behind the Consumer Price Index represents an average hypothetical U.S. household's consumption, 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.

This problem has a straightforward solution. If the Consumer Price Index does not serve the desired purpose, then invent another index, based on a basket of goods appropriate for the group of interest. The Bureau of Labor Statistics 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. We can break it down into price indices for different industries, commodities, and stages of processing (like finished goods, intermediate goods, or crude materials for further processing). There is an International Price Index based on the prices of merchandise that is exported or imported. An Employment Cost Index measures wage inflation in the labor market. The GDP deflator, which the Bureau of Economic Analysis measures, is a price index that includes all the GDP components (that is, consumption plus investment plus government plus exports minus imports). Unlike the CPI, its baskets are not fixed but re-calculate what that year's GDP would have been worth using the base-year's prices. MIT's Billion Prices Project is a more recent alternative attempt to measure prices: economists collect data online from retailers and then put them into an index that they compare to the CPI (Source: http://bpp.mit.edu/usa/).

What's the best measure of inflation? If one is concerned with the most accurate measure of inflation, one should use the GDP deflator as it picks up the prices of 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, one should use the CPI, as it only picks up prices of products purchased by households. That is why economists sometimes refer to the CPI 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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8.4: How the U.S. and Other Countries Experience Inflation

Learning Objectives

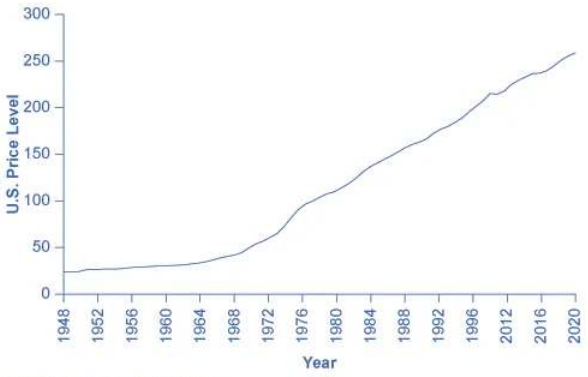
By the end of this section, you will be able to:

- Identify patterns of inflation for the United States using data from the Consumer Price Index
- Identify patterns of inflation on an international level

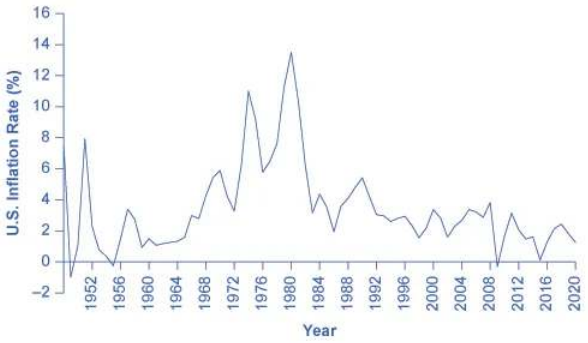
In the last three decades, inflation has been relatively low in the U.S. economy, with the Consumer Price Index typically rising 2% to 4% per year. Looking back over the twentieth century, there have been several periods where inflation caused the price level to rise at double-digit rates, but nothing has come close to hyperinflation.

Historical Inflation in the U.S. Economy

Figure 9.3 (a) shows the level of prices in the Consumer Price Index stretching back to 1913. In this case, the base years (when the CPI is defined as 100) are set for the average level of prices that existed from 1982 to 1984. Figure 9.3 (b) shows the annual percentage changes in the CPI over time, which is the inflation rate.



(a) U.S. price level 1948-2020



(b) U.S. inflation rate 1948-2020

Figure 9.3 U.S. Price Level and Inflation Rates since 1947 Graph a shows the trends in the U.S. price level from the year 1947 to 2020. In 1947, the graph starts out close to 22. It gradually increases until about 1973, then increases more rapidly through the remainder of the 1970s and beyond, with periodic dips, until 2020, when it reached around 260. Graph b shows the trends in U.S. inflation rates from the year 1948 to 2020. In 1948, the graph starts out with inflation at almost 7%, goes up and down periodically, with peaks in the 1940s and the 1970s, until settling to around 1.2% in 2020.

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Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly.

The first two waves of inflation are easy to characterize in historical terms: they are right after World War I and World War II. However, there are also two periods of severe negative inflation—called deflation—in the early decades of the twentieth century: one following the deep 1920-21 recession and the other during the Great Depression of the 1930s. (Since inflation is a time when the buying power of money in terms of goods and services is reduced, deflation will be a time when the buying power of money in terms of goods and services increases.) For the period from 1900 to about 1960, the major inflations and deflations nearly balanced each other out, so the average annual rate of inflation over these years was only about 1% per year. A third wave of more severe inflation arrived in the 1970s and departed in the early 1980s.

Link It Up

Visit this website to use an inflation calculator and discover how prices have changed in the last 100 years.

Times of recession or depression often seem to be times when the inflation rate is lower, as in the recession of 1920–1921, the Great Depression, the recession of 1980–1982, and the Great Recession in 2008–2009. There were a few months in 2009 that were deflationary, but not at an annual rate. High levels of unemployment typically accompany recessions, and the total demand for goods falls, pulling the price level down. Conversely, the rate of inflation often, but not always, seems to start moving up when the economy is growing very strongly, like right after wartime or during the 1960s. The frameworks for macroeconomic analysis, that we developed in other chapters, will explain why recession often accompanies higher unemployment and lower inflation, while rapid economic growth often brings lower unemployment but higher inflation.

Inflation around the World

Around the rest of the world, the pattern of inflation has been very mixed; Figure 9.4 shows inflation rates over the last several decades. Many industrialized countries, not just the United States, had relatively high inflation rates in the 1970s. For example, in 1975, Japan's inflation rate was over 8% and the inflation rate for the United Kingdom was almost 25%. In the 1980s, inflation rates came down in the United States and in Europe and have largely stayed down.

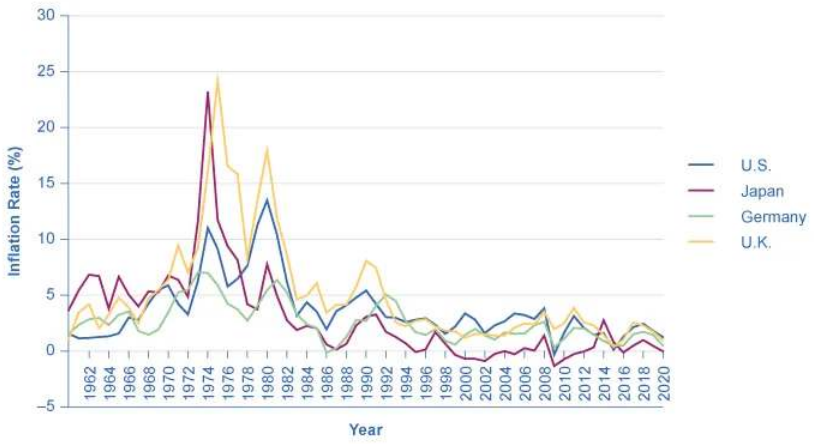
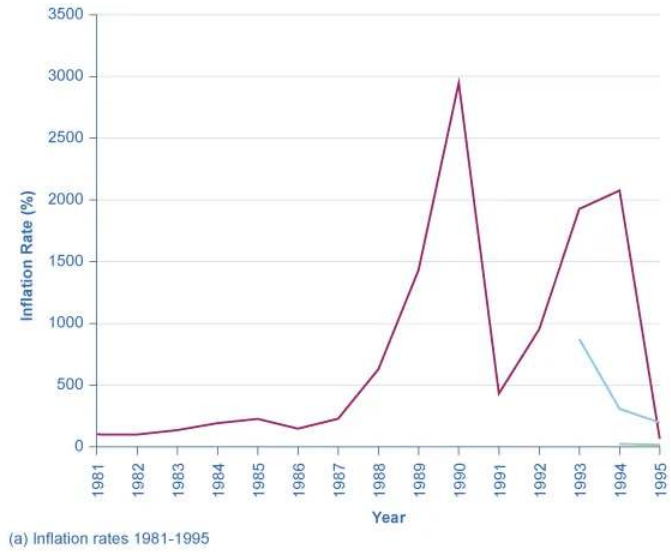
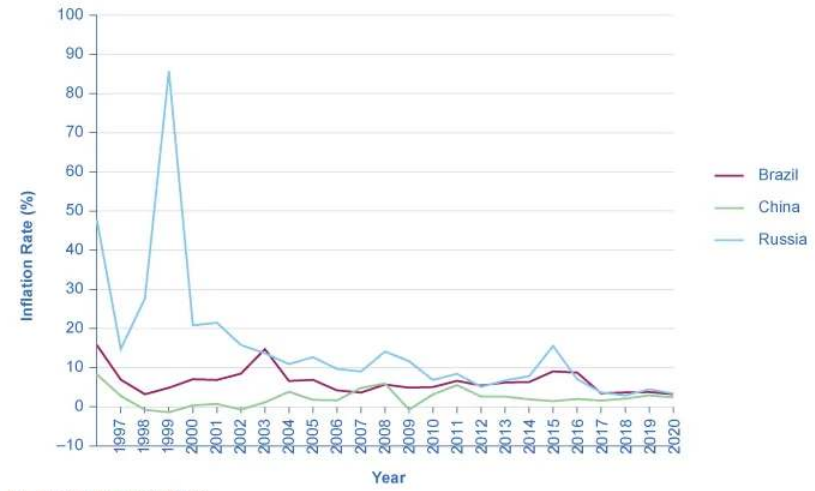


Figure 9.4 Countries with Relatively Low Inflation Rates, 1961–2020 This chart shows the annual percentage change in consumer prices compared with the previous year's consumer prices in the United States, the United Kingdom, Japan, and Germany.

Countries with controlled economies in the 1970s, like the Soviet Union and China, historically had very low rates of measured inflation—because prices were forbidden to rise by law, except for the cases where the government deemed a price increase to be due to quality improvements. However, these countries also had perpetual shortages of goods, since forbidding prices to rise acts like a price ceiling and creates a situation where quantity demanded often exceeds quantity supplied. As Russia and China made a transition toward more market-oriented economies, they also experienced outbursts of inflation, although we should regard the statistics for these economies as somewhat shakier. Inflation in China averaged about 10% per year for much of the 1980s and early 1990s, although it has dropped off since then. Russia experienced hyperinflation—an outburst of high inflation—of 2,500% per year in the early 1990s, although by 2006 Russia's consumer price inflation had dipped below 10% per year, as Figure 9.5 shows. The closest the United States has ever reached hyperinflation was during the 1860–1865 Civil War, in the Confederate states.



(a) Inflation rates 1981-1995



(b) Inflation rates 1996-2020

Figure 9.5 Countries with Relatively High Inflation Rates, 1981–2020 These charts show the percentage change in consumer prices compared with the previous year's consumer prices in Brazil, China, and Russia. (a) Of these, Brazil and Russia experienced very high inflation at some point between the late-1980s and late-1990s. (b) Though not as high, China also had high inflation rates in the mid-1990s. Even though their inflation rates have come down over the last two decades, several of these countries continue to see significant inflation rates. (Sources: www.inflation.eu/inflation-rates; http://research.stlouisfed.org/fred2...FPCPITOTLZGBRA; http://research.stlouisfed.org/fred2...HNCPIALLMINMEI; http://research.stlouisfed.org/fred2...FPCPITOTLZGRUS)

Many countries in Latin America experienced raging inflation during the 1980s and early 1990s, with inflation rates often well above 100% per year. In 1990, for example, both Brazil and Argentina saw inflation climb above 2000%. Certain countries in Africa experienced extremely high rates of inflation, sometimes bordering on hyperinflation, in the 1990s. Nigeria, the most populous country in Africa, had an inflation rate of 75% in 1995.

In the early 2000s, the problem of inflation appears to have diminished for most countries, at least in comparison to the worst times of recent decades. As we noted in this earlier Bring it Home feature, in recent years, the world's worst example of hyperinflation was in Zimbabwe, where at one point the government was issuing bills with a face value of $100 trillion (in Zimbabwean dollars)—that is, the bills had $100,000,000,000,000 written on the front, but were almost worthless. In many countries, the memory of double-digit, triple-digit, and even quadruple-digit inflation is not very far in the past.

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8.5: The Confusion Over Inflation

Learning Objectives

By the end of this section, you will be able to:

- Explain how inflation can cause redistributions of purchasing power
- Identify ways inflation can blur the perception of supply and demand
- Explain the economic benefits and challenges of inflation

Economists usually oppose high inflation, but they oppose it in a milder way than many non-economists. Robert Shiller, 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 use 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. However, 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: unintended redistributions of purchasing power, blurred price signals, and difficulties in long-term planning.

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 considerable 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 diminishes. However, 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 be affected by 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 transforming 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. Thus, the

government taxes a person who invests $10,000 and receives a 5% nominal rate of interest 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. However, 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 last row of Table 9.1 at the start of this chapter showed that the average hourly wage in manufacturing in the U.S. economy increased from $3.23 in 1970 to $30.11 in 2021, which is an increase by a factor of close to ten. Over that time period, the Consumer Price Index increased by about a factor of eight. 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 government adjusts minimum wage for inflation only infrequently, minimum wage workers are losing purchasing power from their nominal wages, as Figure 9.6 shows.

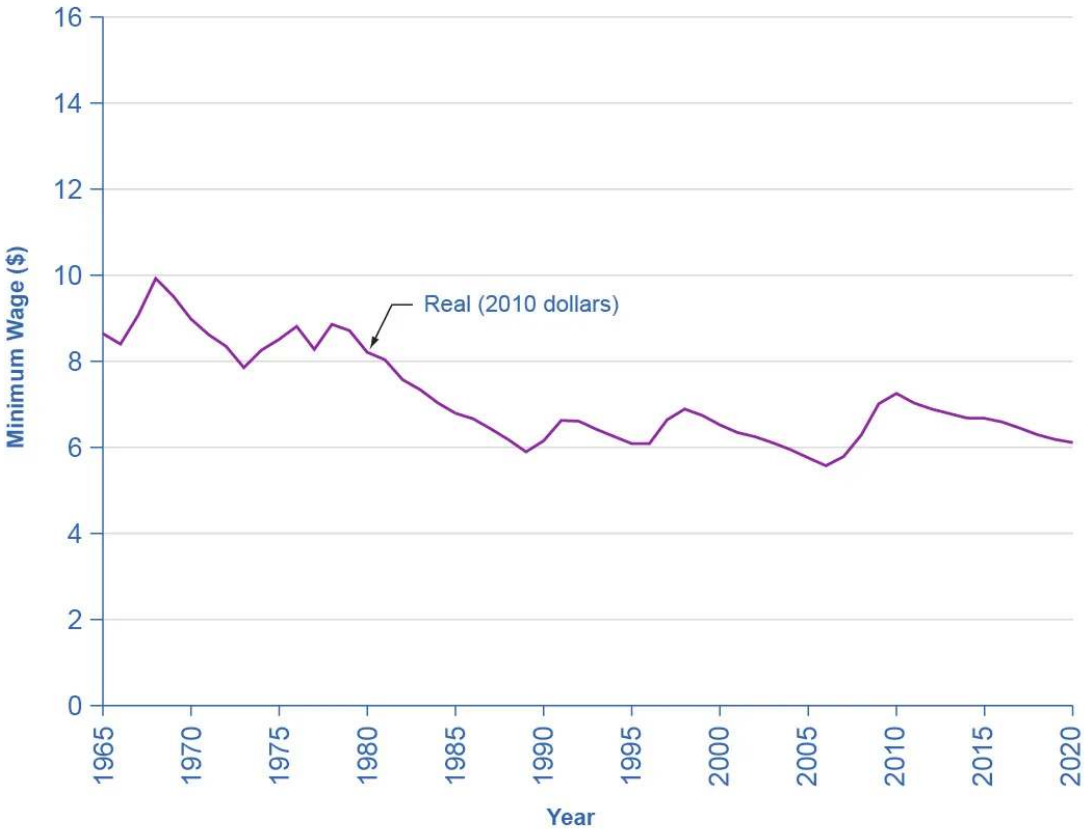


Figure 9.6 U.S. Minimum Wage and Inflation After adjusting for inflation, the federal minimum wage dropped about 30 percent from 1965–2020, even though the nominal figure climbed from $1.40 to $7.25 per hour. Increases in the minimum wage in between 2008 and 2010 kept the decline from being worse—as it would have been if the wage had remained the same as it did from 1997 through 2007. Since 2010, the real minimum wage has continued to decline. (Sources: http://www.dol.gov/whd/minwage/chart.htm and 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, economists call pensions “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 employee 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 are not burdened by 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 borrower must repay the loan at a real interest rate of 6%. However, 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 receive repayment 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.

The unintended redistributions of buying power that inflation causes 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 the general public dislikes inflation 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 Clear It Up feature shows.

Clear It Up

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 was able to 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.*

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 we perceive price signals more vaguely, like a radio program received with considerable 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 and shortages.

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 we cannot know the rate of future inflation.

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 inflation eroding the value of that cash. However, 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 Figure 9.7 shows.

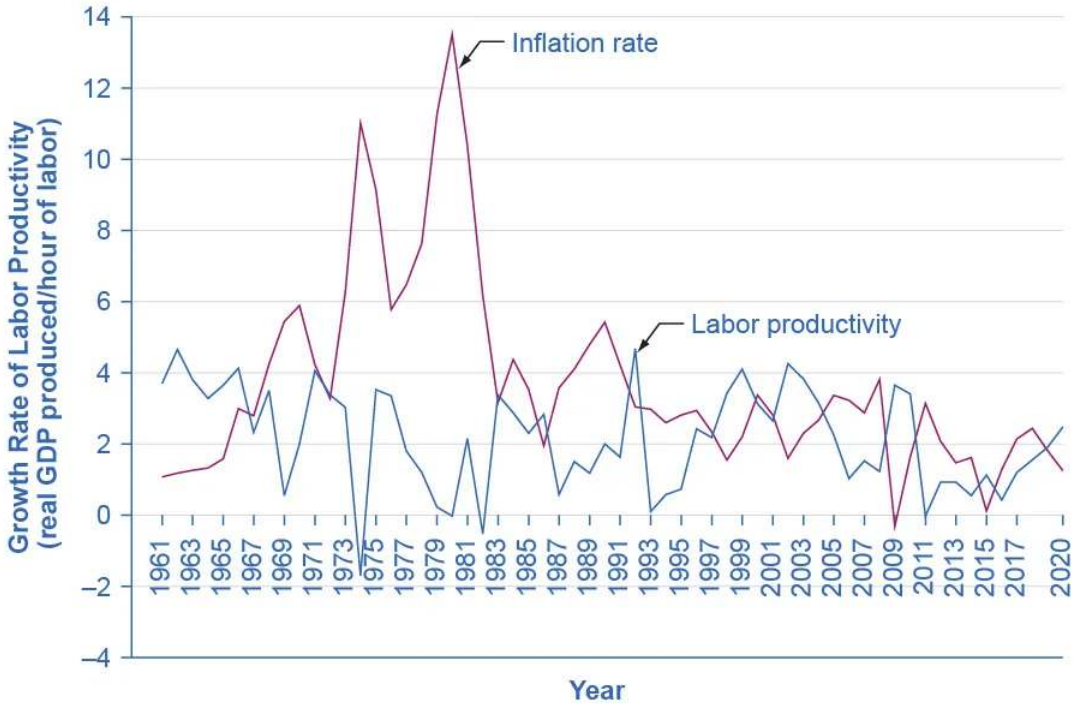


Figure 9.7 U.S. Inflation Rate and U.S. Labor Productivity, 1961–2020 Over the last several decades in the United States, there have been times when rising inflation rates have been closely followed by lower productivity rates and lower inflation rates have corresponded to increasing productivity rates. As the graph shows, however, this correlation does not always exist.

Any Benefits of 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. Low inflation is also better than deflation which occurs with severe recessions.

Second, economists sometimes argue that moderate inflation may help the economy by making wages in labor markets more flexible. The discussion in 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 account for all the effects of inflation. 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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8.6: Indexing and Its Limitations

Learning Objectives

By the end of this section, you will be able to:

- Explain the relationship between indexing and inflation
- Identify three ways the government can control inflation through macroeconomic policy

When a price, wage, or interest rate is adjusted automatically with inflation, economists use the term indexed. An indexed payment increases according to the index number that measures inflation. Those in private markets and government programs observe a wide range of indexing arrangements. Since the negative effects of inflation depend in large part on having inflation unexpectedly affect one part of the economy but not another—say, increasing the prices that people pay but not the wages that workers receive—indexing will take some of the sting out of inflation.

Indexing in Private Markets

In the 1970s and 1980s, labor unions commonly negotiated wage contracts that had cost-of-living adjustments (COLAs) which guaranteed that their wages would keep up with inflation. These contracts were sometimes written as, for example, COLA plus 3%. Thus, if inflation was 5%, the wage increase would automatically be 8%, but if inflation rose to 9%, the wage increase would automatically be 12%. COLAs are a form of indexing applied to wages.

Loans often have built-in inflation adjustments, too, so that if the inflation rate rises by two percentage points, then the interest rate that a financial institution charges on the loan rises by two percentage points as well. An adjustable-rate mortgage (ARM) is a type of loan that one can use to purchase a home in which the interest rate varies with the rate of inflation. Often, a borrower will be able to receive a lower interest rate if borrowing with an ARM, compared to a fixed-rate loan. The reason is that with an ARM, the lender is protected against the risk that higher inflation will reduce the real loan payments, and so the risk premium part of the interest rate can be correspondingly lower.

A number of ongoing or long-term business contracts also have provisions that prices will adjust automatically according to inflation. Sellers like such contracts because they are not locked into a low nominal selling price if inflation turns out higher than expected. Buyers like such contracts because they are not locked into a high buying price if inflation turns out to be lower than expected. A contract with automatic adjustments for inflation in effect agrees on a real price for the borrower to pay, rather than a nominal price.

Indexing in Government Programs

Many government programs are indexed to inflation. The U.S. income tax code is designed so that as a person's income rises above certain levels, the tax rate on the marginal income earned rises as well. That is what the expression "move into a higher tax bracket" means. For example, according to the basic tax tables from the Internal Revenue Service, in 2020, a married person filing jointly owed 10% of all taxable income from $0 to $19,750; 12% of all income from $19,751 to $80,250; 22% of all taxable income from $80,251 to $171,050; 24% of all taxable income from $171,051 to $326,600; 32% of all taxable income from $326,601 to $414,700; 35% of all taxable income from $414,701 to $622,050; and 37% of all income from $622,051 and above.

Because of the many complex provisions in the rest of the tax code, it is difficult to determine exactly the taxes an individual owes the government based on these numbers, but the numbers illustrate the basic theme that tax rates rise as the marginal dollar of income rises. Until the late 1970s, if nominal wages increased along with inflation, people were moved into higher tax brackets and owed a higher proportion of their income in taxes, even though their real income had not risen. In 1981, the government eliminated this "bracket creep". Now, the income levels where higher tax rates kick in are indexed to rise automatically with inflation.

The Social Security program offers two examples of indexing. Since the passage of the Social Security Indexing Act of 1972, the level of Social Security benefits increases each year along with the Consumer Price Index. Also, Social Security is funded by payroll taxes, which the government imposes on the income earned up to a certain amount—$137,700 in 2020. The government adjusts this level of income upward each year according to the rate of inflation, so that an indexed increase in the Social Security tax base accompanies the indexed rise in the benefit level.

As yet another example of a government program affected by indexing, in 1996 the U.S., government began offering indexed bonds. Bonds are means by which the U.S. government (and many private-sector companies as well) borrows money; that is, investors buy the bonds, and then the government repays the money with interest. Traditionally, government bonds have paid a fixed rate of interest. This policy gave a government that had borrowed an incentive to encourage inflation, because it could then repay its past borrowing in inflated dollars at a lower real interest rate. However, indexed bonds promise to pay a certain real rate of interest above whatever inflation rate occurs. In the case of a retiree trying to plan for the long term and worried about the risk of inflation, for example, indexed bonds that guarantee a rate of return higher than inflation—no matter the level of inflation—can be a very comforting investment.

Might Indexing Reduce Concern over Inflation?

Indexing may seem like an obviously useful step. After all, when individuals, firms, and government programs are indexed against inflation, then people can worry less about arbitrary redistributions and other effects of inflation.

However, some of the fiercest opponents of inflation express grave concern about indexing. They point out that indexing is always partial. Not every employer will provide COLAs for workers. Not all companies can assume that costs and revenues will rise in lockstep with the general rates of inflation. Not all interest rates for borrowers and savers will change to match inflation exactly. However, as partial inflation indexing spreads, the political opposition to inflation may diminish. After all, older people whose Social Security benefits are protected against inflation, or banks that have loaned their money with adjustable-rate loans, no longer have as much reason to care whether inflation heats up. In a world where some people are indexed against inflation and some are not, financially savvy businesses and investors may seek out ways to be protected against inflation, while the financially unsophisticated and small businesses may feel it the most.

A Preview of Policy Discussions of Inflation

This chapter has focused on how economists measure inflation, historical experience with inflation, how to adjust nominal variables into real ones, how inflation affects the economy, and how indexing works. We have barely hinted at the causes of inflation, and we have not addressed government policies to deal with inflation. We will examine these issues in depth in other chapters. However, it is useful to offer a preview here.

We can sum up the cause of inflation in one phrase: Too many dollars chasing too few goods. The great surges of inflation early in the twentieth century came after wars, which are a time when government spending is very high, but consumers have little to buy, because production is going to the war effort. Governments also commonly impose price controls during wartime. After the war, the price controls end and pent-up buying power surges forth, driving up inflation. Otherwise, if too few dollars are chasing too many goods, then inflation will decline or even turn into deflation. Therefore, we typically associate slowdowns in economic activity, as in major recessions and the Great Depression, with a reduction in inflation or even outright deflation.

The policy implications are clear. If we are to avoid inflation, the amount of purchasing power in the economy must grow at roughly the same rate as the production of goods. Macroeconomic policies that the government can use to affect the amount of purchasing power—through taxes, spending, and regulation of interest rates and credit—can thus cause inflation to rise or reduce inflation to lower levels.

Bring It Home

Inflation in a Pandemic—A Return to the 1970s, or a Temporary Adjustment?

The pandemic-induced recession caused all sorts of disruptions to our economy, including inflation. During the pandemic, the prices for goods like gas and cars fell as people shifted to remote work and canceled travel plans. But as the economy started to recover from the pandemic in early 2021, we started to see large increases in these prices. Higher prices were also fueled by the injections of cash into the economy through stimulus checks and unemployment benefits. The pandemic also caused shortages throughout the global supply chain, further pushing prices up (you'll learn more about this idea in a few chapters when we talk about aggregate supply and demand).

With headline annualized inflation rates in 2021 exceeding 6%, the question in the next few years is whether we'll see permanently high inflation rates of 9%, 10%, or more, like we did in the 1970s and early-1980s. Some economists believe the pandemic-induced inflation is just a transitory adjustment—indeed, used car and gasoline prices rose dramatically in 2010 and

2011 as well, as we were recovering from the Great Recession. Others are more concerned that the inflation is permanent. Shortages continue to exist throughout the economy as of early 2022, and if consumers expect higher inflation, it can be a self-fulfilling prophecy, as they start buying things now in order to avoid future bouts of inflation.

As you learned about earlier, inflation is a major concern of consumers, if less of an issue among economists. But inflation should be matched by increases in living standards, otherwise there could be major implications for the economy.

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8.7: Key Terms

adjustable-rate mortgage (ARM)
a loan a borrower uses to purchase a home in which the interest rate varies with market interest rates

base year
arbitrary year whose value as an index number economists define 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—for example, 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

basket of goods and services
a hypothetical group of different items, with specified quantities of each one meant to represent a "typical" set of consumer purchases, used as a basis for calculating how the price level changes over time

Consumer Price Index (CPI)
a measure of inflation that U.S. government statisticians calculate based on the price level from a fixed basket of goods and services that represents the average consumer's purchases

core inflation index
a measure of inflation typically calculated by taking the CPI and excluding volatile economic variables such as food and energy prices to better measure the underlying and persistent trend in long-term prices

cost-of-living adjustments (COLAs)
a contractual provision that wage increases will keep up with inflation

deflation
negative inflation; most prices in the economy are falling

Employment Cost Index
a measure of inflation based on wages paid in the labor market

GDP deflator
a measure of inflation based on the prices of all the GDP components

hyperinflation
an outburst of high inflation that often occurs (although not exclusively) when economies shift from a controlled economy to a market-oriented economy

index number
a unit-free number derived from the price level over a number of years, which makes computing inflation rates easier, since the index number has values around 100

indexed
a price, wage, or interest rate is adjusted automatically for inflation

inflation
a general and ongoing rise in price levels in an economy

International Price Index
a measure of inflation based on the prices of merchandise that is exported or imported

Producer Price Index (PPI)
a measure of inflation based on prices paid for supplies and inputs by producers of goods and services

quality/new goods bias

inflation calculated using a fixed basket of goods over time tends to overstate the true rise in cost of living, because it does not account for improvements in the quality of existing goods or the invention of new goods

substitution bias

an inflation rate calculated using a fixed basket of goods over time tends to overstate the true rise in the cost of living, because it does not take into account that the person can substitute away from goods whose prices rise considerably

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8.8: Key Concepts and Summary

9.1 Tracking Inflation

Economists measure the price level by using a basket of goods and services and calculating how the total cost of buying that basket of goods will increase over time. Economists often express the price level in terms of index numbers, which transform the cost of buying the basket of goods and services into a series of numbers in the same proportion to each other, but with an arbitrary base year of 100. We measure the inflation rate as the percentage change between price levels or index numbers over time.

9.2 How to Measure Changes in the Cost of Living

Measuring price levels with a fixed basket of goods will always have two problems: the substitution bias, by which a fixed basket of goods does not allow for buying more of what becomes relatively less expensive and less of what becomes relatively more expensive; and the quality/new goods bias, by which a fixed basket cannot account for improvements in quality and the advent of new goods. These problems can be reduced in degree—for example, by allowing the basket of goods to evolve over time—but we cannot totally eliminate them. The most commonly cited measure of inflation is the Consumer Price Index (CPI), which is based on a basket of goods representing what the typical consumer buys. The Core Inflation Index further breaks down the CPI by excluding volatile economic commodities. Several price indices are not based on baskets of consumer goods. The GDP deflator is based on all GDP components. The Producer Price Index is based on prices of supplies and inputs bought by producers of goods and services. An Employment Cost Index measures wage inflation in the labor market. An International Price Index is based on the prices of merchandise that is exported or imported.

9.3 How the U.S. and Other Countries Experience Inflation

In the U.S. economy, the annual inflation rate in the last two decades has typically been around 2% to 4%. The periods of highest inflation in the United States in the twentieth century occurred during the years after World Wars I and II, and in the 1970s. The period of lowest inflation—actually, with deflation—was the 1930s Great Depression.

9.4 The Confusion Over Inflation

Unexpected inflation will tend to hurt those whose money received, in terms of wages and interest payments, does not rise with inflation. In contrast, inflation can help those who owe money that they can pay in less valuable, inflated dollars. Low rates of inflation have relatively little economic impact over the short term. Over the medium and the long term, even low rates of inflation can complicate future planning. High rates of inflation can muddle price signals in the short term and prevent market forces from operating efficiently, and can vastly complicate long-term savings and investment decisions.

9.5 Indexing and Its Limitations

A payment is indexed if it is automatically adjusted for inflation. Examples of indexing in the private sector include wage contracts with cost-of-living adjustments (COLAs) and loan agreements like adjustable-rate mortgages (ARMs). Examples of indexing in the public sector include tax brackets and Social Security payments.

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CHAPTER OVERVIEW

9: Introduction to Finance

9.1: Why It Matters
9.2: What Is Finance?
9.3: The Role of Finance in an Organization
9.4: Importance of Data and Technology
9.5: Careers in Finance
9.6: Markets and Participants
9.7: Microeconomic and Macroeconomic Matters
9.8: Financial Instruments
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9.1: Why It Matters



Figure 1.1 Finance is the linchpin that connects and directs many parts of a business or organization. (credit: modification of work "Finance behind the Glass" by Max London/flickr, CC BY 2.0)

Chapter Outline

1.1 What Is Finance?
1.2 The Role of Finance in an Organization
1.3 Importance of Data and Technology
1.4 Careers in Finance
1.5 Markets and Participants
1.6 Microeconomic and Macroeconomic Matters
1.7 Financial Instruments
1.8 Concepts of Time and Value

Finance is essential to the management of a business or organization. Without good financial protocol, safeguards, and tools, running a successful business is more difficult. In 1978, Bacon Signs was a family-owned, regional Midwestern sign company engaged in the manufacture, sale, installation, and maintenance of commercial signage. The company was about to transition from the second to third generation of family ownership. Bacon Signs, established in 1901, had weathered the Great Depression, World War II, the Vietnam War, and the oil embargo and was working its way through historically high rates of inflation and interest rates. The family business had successfully struggled through the ebb and flow of the regional and national economy by providing quality products and service to its regional clients.

In the early 1980s, the company's fortunes changed permanently for the better. The owner recognized that the custom signs built by his firm were superior in quality to the signs it installed for national franchises. The owner worked with the company's banker and vice president of finance and operations to develop a production, sales, and financing plan that could be offered to the larger national sign companies. The larger companies agreed to subcontract manufacturing of midsize orders to Bacon Signs. The firm then made a commitment to build and deliver these signs on time and under budget. As Bacon Signs' reputation for quality grew, so did demand for its products. The original financing plan anticipated this potential growth and was designed to meet anticipated capital requirements so that the firm could expand how and when it needed to.

Bacon Signs' ability to manufacture and deliver a high-quality product at a good price was the true value of the firm. However, without the planning and ability to raise capital facilitated by the financing plan, the firm would not have been able to act on its strengths at the critical moment. Financing was the key to expansion and financial stability for the firm.[1]

In this book, we demonstrate that business finance is about developing and understanding the tools that help people make consistently good and repeatable decisions.

Footnotes

- 1Dun & Bradstreet. “Bacon Signs, Inc.” *D&B Business Directory.* www.dnb.com/business-directo...ancials-anchor

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9.2: What Is Finance?

Learning Objectives

By the end of this section, you will be able to:

- Describe the main areas in finance.
- Explain the importance of studying finance.
- Discuss the concepts of risk and return.

Definition of Finance

Finance is the study of the management, movement, and raising of money. The word *finance* can be used as a verb, such as when the First National Bank agrees to finance your home mortgage loan. It can also be used as a noun referring to an entire industry. At its essence, the study of finance is about understanding the uses and sources of cash, as well as the concept of risk-reward trade-off. Finance is also a tool that can help us be better decision makers.

Basic Areas in Finance

Finance is divided into three primary areas in the domestic market: business finance, investments, and financial markets and institutions (see Figure 1.2). We look at each here in turn.

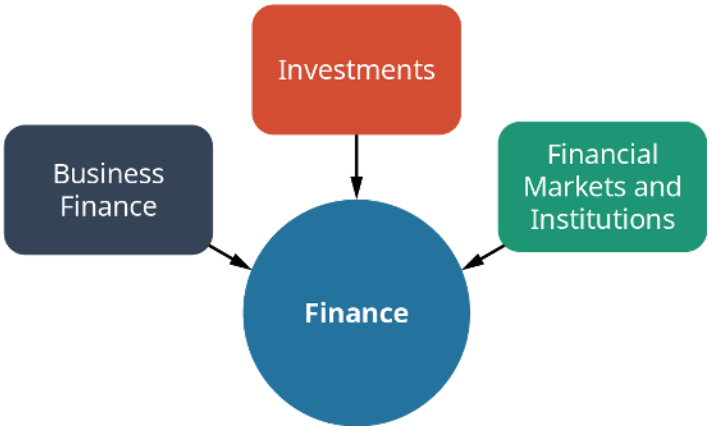


Figure 1.2: The Three Basic Areas of Study in Finance

Business Finance

Business finance looks at how managers can apply financial principles to maximize the value of a firm in a risky environment. Businesses have many stakeholders. In the case of corporations, the shareholders own the company, and they hire managers to run the company with the intent to maximize shareholder wealth. Consequently, all management decisions should run through the filter of these questions: “How does this decision impact the wealth of the shareholders?” and “Is this the best decision to be made for shareholders?”

In business finance, managers focus on three broad areas (see Figure 1.3).

1. Working capital management (WCM) is the study and management of short-term assets and liabilities. The chief financial officer (CFO) and the finance team are responsible for establishing company policy for how to manage WCM. The finance department determines credit policy, establishes minimum criteria for the extension of credit to clients, terms of lending, when to extend, and when to take advantage of short-term creditor financing. The accounting department basically implements the finance department’s policies. In many firms, the accounting and finance functions operate in the same department; in others, they are separate.
2. **Capital budgeting** is the process of determining which long-term or fixed assets to acquire in an effort to maximize shareholder value. Capital budgeting decisions add the greatest value to a firm. As such, capital budgeting is thought to be one of the most important financial functions within a firm. The capital budgeting process consists of estimating the value of

potential investments by forecasting the size, timing, and risk of cash flows associated with the investments. The finance department develops and compiles cash flow estimates with input from the marketing, operations, accounting, human resources, and economics departments to develop a portfolio of investment projects that collectively maximize the value of the firm.

3. Capital structure is the process by which managers focus more specifically on long-term debt and increasing shareholder wealth. Capital structure questions require financial managers to work with economists, lenders, underwriters, investment bankers, and other sources of external financial information and financial capital. When Bacon Signs developed its financial plan, the executives included each of these three aspects of business finance into the plan.

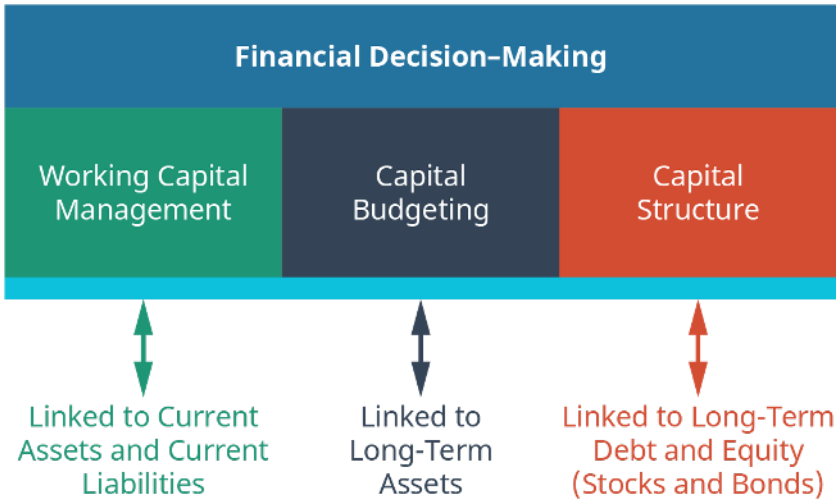


Figure 1.3: How Corporate Finance Decision-Making Activities Relate to the Balance Sheet

Figure 1.3 demonstrates how the three essential decision-making activities of the financial manager are related to a balance sheet. Working capital management focuses on short-term assets and liabilities, capital budgeting is focused on long-term assets, and capital structure is concerned with the mix of long-term debt and equity financing.

Investments

Investments are products and processes used to create and grow wealth. Most commonly, investment topics include the discussion and application of the different types of financial instruments, delivery vehicles, regulation, and risk-and-return opportunities. Topics also include a discussion of stocks, bonds, and derivative securities such as futures and options. A broad coverage of investment instruments would include mutual funds, exchange-traded funds (ETFs), and investment vehicles such as 401k plans or individual retirement accounts (IRAs). In addition, real assets such as gold, real estate, and commodities are also common discussion topics and investment opportunities.

Investments is the most interesting area of finance for many students. Television programs such as *Billions* and movies such as *Wall Street* make investing appear glamorous, dangerous, shady, or intoxicating, depending on the situation and the attitude of the viewer. In these programs, the players and their decisions can lead to tremendous wealth or tremendous losses. In reality, most of us will manage our portfolios well shy of the extremes portrayed by the entertainment industry. However, we will need to make personal and business investment decisions, and many students reading this material will work in the investment industry as personal investment advisers, investment analysts, or portfolio managers.

Financial Markets and Institutions

Financial markets and institutions are the firms and regulatory agencies that oversee our financial system. There is overlap in this area with investments and business finance, as the firms involved are profit seeking and need good financial management. They also are commonly the firms that facilitate investment practices in our economy. A financial institution regulated by a federal or state agency will likely handle an individual investment such as the purchase of a stock or mutual fund.

Much of the US regulatory structure for financial markets and institutions developed in the 1930s as a response to the stock market crash of 1929 and the subsequent Great Depression. In the United States, the desire for safety and protection of investors and the financial industry led to the development of many of our primary regulatory agencies and financial regulations. The Securities and

Exchange Commission (SEC) was formed with the passage of the Securities Act of 1933 and Securities Exchange Act of 1934. Major bank regulation in the form of the Glass-Steagall Act (1933) and the Banking Act of 1935 gave rise to government-backed bank deposit insurance and a more robust Federal Reserve Bank.

These regulatory acts separated investment banking from commercial banking. Investment banks and investment companies continued to underwrite and facilitate new bond and equity issues, provide financial advice, and manage mutual funds. Commercial banks and other depository institutions such as savings and loans and credit unions left the equity markets and reduced their loan portfolios to commercial and personal lending but could purchase insurance for their primary sources of funds, checking, and savings deposits.

Today, the finance industry barely resembles the structure your parents and grandparents grew up and/or worked in. Forty years of deregulation have reshaped the industry. Investment and commercial bank operations and firms have merged. The separation of activities between investment and commercial banking has narrowed or been eliminated. Competition from financial firms abroad has increased, and the US financial system, firms, and regulators have learned to adapt, change, and innovate to continue to compete, grow, and prosper.

The Financial Industry Regulatory Authority (FINRA) formed in 2007 to consolidate and replace existing regulatory bodies. FINRA is an independent, nongovernmental organization that writes and enforces the rules governing registered brokers and broker-dealer firms in the United States. The Securities Investor Protection Corporation (SIPC) is a nonprofit corporation created by an act of Congress to protect the clients of brokerage firms that declare bankruptcy. SIPC is an insurance that provides brokerage customers up to $500,000 coverage for cash and securities held by the firm.

The regulation of the financial industry kicked into high gear in the 1930s and for those times and conditions was a necessary development of our financial industry and regulatory oversight. Deregulation of the finance industry beginning in the 1970s was a necessary pendulum swing in the opposite direction toward more market-based and less restrictive regulation and oversight. The Great Recession of 2007–2009 resulted in the reregulation of several aspects of the financial industry. Some would argue that the regulatory pendulum has swung too far toward deregulation and that the time for more or smarter regulation has returned.

Concepts In Practice: The Great Recession

The Great Recession of 2007–2009 exposed many of the weaknesses of our financial system. The ease with which banks could lower credit standards to allow ill-prepared consumers to purchase real estate and the resulting speed with which the world economy plunged into recession is astounding.

Regulation to address the economic crisis was also swift. Fortunately, Ben Bernanke, chairman of the Federal Reserve at the time, had throughout his career conducted extensive research into the causes of and potential resolution of the Great Depression of the 1930s.[2] He was uniquely qualified to lead the economic response to the crisis. Some resulting laws moved to address the immediate needs and others to correct the underlying causes of the recession.

One immediate fix was the Troubled Asset Relief Program (TARP). TARP authorized the Treasury to buy illiquid assets in order to save the financial institutions so important to lubricating our economy. Politically this was a tough decision, as it appeared that the government bailed out greedy bankers. In the end, however, the program was justified because the economy immediately began a slow but steady recovery, most financial institutions did not fail, and the Treasury recouped all of its investment used in the bailout. However, individual homeowners suffered greatly.

The Dodd-Frank Act of 2008 attempted to address many of the underlying causes of the Great Recession by reorganizing and toughening the regulatory framework, including tighter oversight of critically important financial institutions. Dodd-Frank also created the Consumer Financial Protection Bureau (CFPB) to protect consumers from harm caused by unscrupulous banking activities. Today, the hope is that financial institutions will be stopped short of the gross negligence evident prior to 2007 and consumers won't be left out in the cold due to actions beyond their control.

Sources: History Channel. "Here's What Caused the Great Recession." *YouTube*. May 15, 2018. https://www.youtube.com/watch?v=yM0uonkloXY. Accessed April 18, 2021; Randall D. Guynn, Davis Polk, and Wardwell LLP, "The Financial Panic of 2008 and Financial Regulatory Reform." *Harvard Law School Forum on Corporate Governance*. November 20, 2010. https://corpgov.law.harvard.edu/2010...latory-reform/. Accessed April 18, 2021; Sean Ross. "What Major

Laws Were Created for the Financial Sector Following the 2008 Crisis?" *Investopedia*. Updated March 31, 2020. https://www.investopedia.com/ask/ans...-financial.asp. Accessed April 18, 2021.

Why We Study Finance

Finance is the lubricant that keeps our economy running smoothly. Issuing a mortgage can be profitable for a bank, but it also allows people to live in their own homes and to pay for them over time. Do MasterCard, Venmo, and PayPal make money when you use their product? Sure, but think how much more convenient and safer it is to carry a card or use an app instead of cash. In addition, these services allow you to easily track where and how you spend your money. A well-regulated and independent financial system is important to capital-based economies. Our smoothly functioning financial system has removed us from the days of strictly bartering to our system today, where transactions are as simple as a tap on your mobile phone.

There are any number of professional and personal reasons to study finance. A search of the internet provides a long list of finance-related professions. Interviews with senior managers reveal that an understanding of financial tools and concepts is an important consideration in hiring new employees. Financial skills are among the most important tools for advancement toward greater responsibility and remuneration. Government and work-guaranteed pension benefits are growing less common and less generous, meaning individuals must take greater responsibility for their personal financial well-being now and at retirement. Let's take a closer look at some of the reasons why we study finance.

There are many career opportunities in the fields of finance. A single course in finance such as this one may pique your interest and encourage you to study more finance-related topics. These studies in turn may qualify you for engaging and high-paying finance careers. We take a closer look at financial career opportunities in Careers in Finance.

A career in finance is just one reason to study finance. Finance is an excellent decision-making tool; it requires analytical thinking. Further, it provides a framework for estimating value through an assessment of the timing, magnitude, and risk of cash flows for long-term projects. Finance is important for more immediate activities as well, such as the development of budgets to assure timely distribution of cash flows such as dividends or paychecks.

An understanding of finance and financial markets opens a broader world of available financial investment opportunities. At one time, commercial bank deposits and the occasional investment in stocks, bonds, real estate, or gold may have provided sufficient coverage of investment opportunities, portfolio diversification, and adequate returns. However, in today's market of financial technology, derivative securities, and cryptocurrencies, an understanding of available financial products and categories is key for taking advantage of both new and old financial products.

Link to Learning: Job Information

The internet provides a wealth of information about types of jobs in finance, as well as reasons to study it. Investigate the *Occupational Outlook Handbook* issued by the Bureau of Labor Statistics to see how many of the career opportunities in finance look interesting to you. Think about the type of people you want to work with, the type of work-related activities you enjoy, and where you would like to live. Read "5 Reasons Why You Should Study Finance" at Harvard Business School Online to gain a better understanding of why finance offers a broad career path and is intellectually stimulating and satisfying.

Risk and Return in Finance

Finance tells us that an increase in risk results in an increase in expected return. The study of historical financial markets demonstrates that this relationship generally holds true and that riskier investments over time have provided greater returns. Of course, this is not true all the time and under all conditions; otherwise, where's the risk?

At its most basic level, risk is uncertainty. The study of finance attempts to quantify risk in a way that helps individuals and organizations assess an appropriate trade-off for risk. Risk-return tradeoffs are all around us in our everyday decision-making. When we consider walking across the street in the middle of a city block or walking down to the marked intersection, we are assessing the trade-off between convenience and safety. Should you buy the required text for your class or instead rely on the professor's notes and the internet? Should you buy that new-to-you used car sight unseen, or should you spend the money for a mechanic to assess the vehicle before you buy? Should you accept your first job offer at graduation or hold out for the offer you

really want? A better understanding of finance makes these types of decisions easier and can provide you, as the decision maker, with statistics instead of just intuition.

Return is compensation for making an investment and waiting for the benefit (see Figure 1.4). Return could be the interest earned on an investment in a bond or the dividend from the purchase of stock. Return could be the higher income received and the greater job satisfaction realized from investing in a college education. Individuals tend to be risk averse. This means that for investors to take greater risks, they must have the expectation of greater returns. Investors would not be satisfied if the average return on stocks and bonds were the same as that for a risk-free savings account. Stocks and bonds have greater risk than a savings account, and that means investors expect a greater average return.

The study of finance provides us with the tools to make better and more consistent assessments of the risk-return trade-offs in all decision-making, but especially in financial decision-making. Finance has many different definitions and measurements for risk. Portfolios of investment securities tend to demonstrate the characteristics of a normal return distribution, or the familiar "bell-shaped" curve you studied in your statistics classes. Understanding a security's average and variability of returns can help us estimate the range and likelihood of higher- or lower-than-expected outcomes. This assessment in turn helps determine appropriate prices that satisfy investors' required return premiums based on quantifiable expectations about risk or uncertainty. In other words, finance attempts to measure with numbers what we already "know."

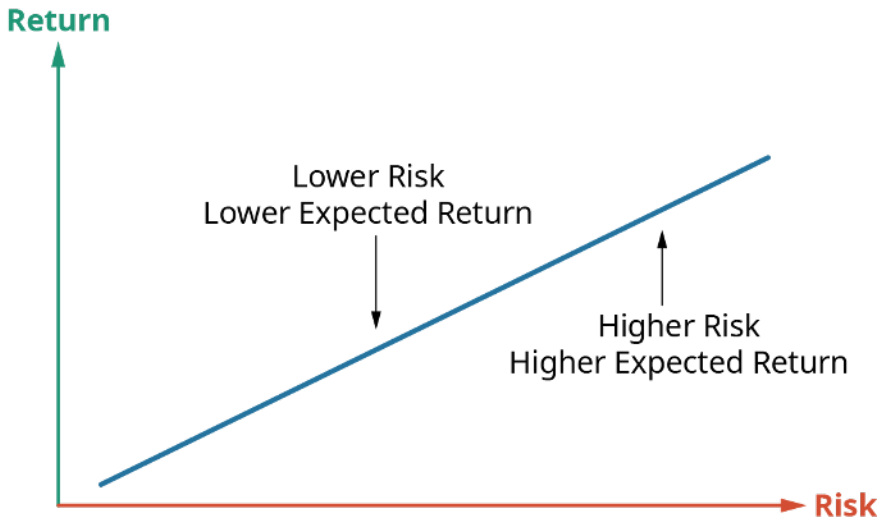


Figure 1.4: Risk and Expected Return This describes the trade-off that invested money can bring higher profits if the investor is willing to accept the risk of possible loss.

The overall uncertainty of returns has several components.

- Default risk on a financial security is the chance that the issuer will fail to make the required payment. For example, a homeowner may fail to make a monthly mortgage payment, or a corporation may default on required semiannual interest payments on a bond.
- Inflation risk occurs when investors have less purchasing power from the realized cash flows from an investment due to rising prices or inflation.
- Diversifiable risk, also known as unsystematic risk, occurs when investors hold individual securities or smallish portfolios and bear the risk that a larger, more well-rounded portfolio could eliminate. In these situations, investors carry additional risk or uncertainty without additional compensation.
- Non-diversifiable risk, or systematic risk, is what remains after portfolio diversification has eliminated unnecessary diversifiable risk. We measure non-diversifiable risk with a statistical term called *beta*. Subsequent chapters on risk and return provide a more in-depth discussion of beta.
- Political risk is associated with macroeconomic issues beyond the control of a company or its managers. This is the risk of local, state, or national governments "changing the rules" and disrupting firm cash flows. Political risk could come about due to zoning changes, product liability decisions, taxation, or even nationalization of a firm or industry.

Footnotes

- 2Brookings Institution. “Ben S. Bernanke.” *Brookings Institute*. https://www.brookings.edu/experts/ben-s-bernanke/; Ben S. Bernanke. “On Milton Friedman’s 90th Birthday.” *The Federal Reserve Board*. November 8, 2002. https://www.federalreserve.gov/board...2002/20021108/

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9.3: The Role of Finance in an Organization

Learning Objectives

By the end of this section, you will be able to:

- Describe the finance function.
- Explain the role of finance and its importance within an organization.

The Finance Function

Finance has many functions within an organization, and there are many job titles to reflect the varied job responsibilities. The comptroller, or more commonly a *controller*, in a for-profit business relies heavily on a knowledge of accounting. Controllers are in charge of financial reporting and the oversight of the accounting activities necessary to develop those reports. Controllers are concerned with payroll functions, accounts receivable, and accounts payable including taxes, inventory control, and any number of short-term asset and liability tracking and monitoring activities. They aid internal and external auditors and are responsible for monitoring and implementing the day-to-day financial operations of the firm.

In most organizations, the treasurer might assume many of the duties of the controller. However, the treasurer is also responsible for monitoring cash flow at a firm and frequently is the contact person for bankers, underwriters, and other outside sources of financing. A treasurer may be responsible for structuring loan and debt obligations and determining when and from whom to borrow funds. Treasurers are also responsible for investing excess funds. Where a controller may face inward toward the organization, the treasurer often faces outward as a representative to the public.

The vice president of finance (VP-F) is an executive-level position and oversees the activities of the controller and treasurer. The chief responsibility of the VP-F is to create and mentor a sufficient and qualified staff that generates reports that are timely, accurate, and thorough.

The chief financial officer, or CFO, is in a “big picture” position. The CFO sets policy for working capital management, determines optimal capital structure for the firm, and makes the final decision in matters of capital budgeting. The CFO is also forward looking and responsible for strategic financial planning and setting financial goals. Compared to a VP-F, a CFO is less of a “hands-on” manager and engages more in visionary and strategic planning.

Financial Planning

Financial planning is critical to any organization, large or small, private or public, for profit or not-for-profit. Financial planning allows a firm to understand the past, present, and future funding needs and distributions required to satisfy all interested parties. For-profit businesses work to maximize the wealth of the owners. These could be shareholders in a publicly traded corporation, the owner-managers of a “mom and pop” store, partners in a law firm, or the principal owners of any other number of business entities. Financial planning helps managers understand the firm’s current status, plan and create processes and contingencies to pursue objectives, and adjust to unexpected events. The more thoughtful and thorough the financial planning process, the more likely a firm will be able to achieve its goals and/or weather hard times. Financial plans typically consider the firm’s strategic objectives, ethical practices, and sources and costs of funds, as well as the development of budgets, scenarios, and contingencies. The financial plan Bacon Signs developed was thorough enough to anticipate when and how growth might occur. The plan that was presented to commercial banks allowed the firm to be guaranteed new financing at critical moments in the firm’s expansion.

Good financial planning has a number of common features.

- It uses past, current, and pro forma (forward-looking) income statements. Pro forma income statements are created using assumptions from past events to make projections for future events. These income statements should develop likely scenarios and provide a sensitivity analysis of key assumptions.
- Cash flow statements are a critical part of any financial planning. Cash flow statements estimate the timing and magnitude of actual cash flows available to meet financial obligations.
- Balance sheets are critical for demonstrating the sources and uses of funds for a firm. One of the most important aspects of business is accounting (see Figure 1.5).

- Forecasting in the form of expected sales, cost of funds, and microeconomic and macroeconomic conditions are essential elements of financial planning.
- Financial analysis including ratio analysis, common-size financial statements, and trend statements are important aspects of financial planning. Such analysis aids in the understanding of where a firm has been, how it stacks up against the competition, and the assessment of target objectives.



Figure 1.5: The Accounting System The accounting system relies on accurate data used to prepare all the financial reports that help to evaluate a firm.

Link to Learning

Elements of a Financial Plan

You can view key elements in a financial plan at the US Small Business Administration's website.

Forecasting and Budgeting

Forecasting and budgeting are common practices for businesses, governmental agencies, not-for-profit firms, and individual households. As with many of the financial topics introduced in this chapter, these activities are valuable for individuals and businesses alike. Budgeting, or planning for the amount, sources, and uses of cash, occurs early in the planning process. It is common for businesses to have developed an annual budget well before the start of the year. With budgeting, a firm establishes objectives for the upcoming period by developing financial statements based on historical data and expectations, as well as aspirations for the future. The budgeting process helps the firm identify what actions need to be undertaken to achieve its objectives. However, no matter how strong the budgeting process, actual events can change the timing and magnitude of expected cash flows.

Financial forecasting addresses the changes necessary to the budgeting process. Budgeting can help identify the differences or variance from expectations, and forecasting becomes the process for adapting to those changes. We attribute to President Eisenhower the saying that "plans are worthless, but planning is everything." That statement applies to business today as well as it did during his service in the military and government. The budgeting or planning process is a road map for organizations, and forecasting helps navigate the inevitable detours toward the firm's objectives.

The budgeting process develops pro forma financial statements such as income and cash flow statements and balance sheets. These provide benchmarks to determine if firms are on course to meet or exceed objectives and serve as a warning if firms are falling short. Budgeting should involve all departments within a firm to determine sources and uses of funds and required funding to meet department and firm objectives. The process should look to emulate successful processes and change or eliminate ineffective ones. Budgeting is a periodic renewal and reminder of the firm's goals.

Financial forecasting often starts with the firm’s budget and recommends changes based on differences between the budgeted financial statements and actual results. Forecasting adjusts management behavior in the immediate term and serves as a foundation for subsequent budgets.

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9.4: Importance of Data and Technology

Learning Objectives

By the end of this section, you will be able to:

- Describe the role of data in finance.
- List and describe the various types of corporate data available.
- Explain how the various types of corporate data can be accessed and analyzed.
- Describe the impact of data digitization.
- Explain how stakeholders use data when making decisions.

Importance of Data

Financial data is important for internal and external analysis of business firms. More accurate and timely data leads to better business and financial decision-making. Financial budgeting and forecasting rely on the creation of several types of financial statements including income statements, the statements of cash flow, and balance sheets, as well as the notes and assumptions used to create the financial statements. Insiders such as executive and middle managers use financial data to evaluate and reevaluate decision-making. Having current and accurate data is key to making consistent value-adding decisions for a firm. Data helps inform managers about how and when to finance projects, which projects to undertake, and necessary changes to make regarding physical, financial, and human resource assets. “Gut feelings” and “seat-of-the-pants” decision-making tend to be inconsistent with value maximization.

Outsiders also use publicly available data about firms to make purchasing, investment, credit, and regulatory decisions. Customers, investors, lenders, suppliers, and regulators must be able to access a firm’s financial information. Investors need to determine how much they are willing to pay for a share of stock, banks need data to determine if a loan should be made, suppliers need financial information to determine if they should supply trade credit, and customers need to know that a firm has priced its products appropriately.

Basic Data Types

Financial statements provide some of the data needed for decision-making. Firms summarize data and develop at least three essential financial statements or reports.

1. The income statement summarizes the flow of revenues and expenses over a specified period. Income statements for publicly traded companies are available quarterly.
2. Statements of cash flow identify actual receipt and use of cash over a period.
3. Balance sheets show the existing assets, liabilities, and equity as of a particular date.

These statements represent book values and reflect historical costs and accounting adjustments such as accumulated depreciation. Book values often differ significantly from market values. Market values look forward and reflect expectations, whereas book values represent what has occurred.

In addition to the internal data summarized on financial statements, firms and outside stakeholders also seek external sources of information. External data gathering includes surveys of customers and suppliers, market research, new product development, statistical analysis, agreements with creditors, and discussions with government officials. Broader macroeconomic data is also valuable as it applies to expected market demand, unemployment, inflation, interest rates, and economic growth.

The Impact of Digitization

Data digitization makes the storage and transmission of data easier and more cost effective. Some data starts out as digital data, such as that from a Microsoft Suite product. The Excel files and Word documents we create are ubiquitous and easily stored and transmitted. Cloud storage and video conferencing are now the norm. Emails and Zoom meetings are quick, easy, and inexpensive ways to share and store information. Businesses now create an e-trail, or virtual paper trail, to document, verify, and share processes. Because data is now much easier to access, firms bear the added responsibility of ensuring that it is stored and secured properly so that individuals cannot inappropriately alter or delete information.

Data storage has changed significantly in the last decade as companies have moved the storage of digital data to the cloud. The advantages include only paying for the storage actually used, reduced energy consumption, access to specialized data protection services, and software and hardware maintenance. However, the risk of data hacks and the safety of data are key concerns in the storage of digitized information.

Uses of Data

Taken together and separately, the internally generated financial statements can provide managers with a wealth of information to enable superior decision-making. Harvard Business School identifies six ways managers can use financial statements.[3]

1. Measuring the impact of business decisions such as new software, marketing plan, or product line
2. Aiding in the development of budgets by creating a starting point for future expectations
3. Aiding in cost cutting or the reduction of duplicate activities
4. Providing data-supported strategic planning and visioning
5. Ensuring consistent data and content across departments
6. Motivating teams to set, meet, and exceed goals and objectives

Concepts In Practice

How and Why Managers Use Financial Statements: The Case of Peloton

Should you lease a new car or buy one? Do you opt for the more expensive high-tech production equipment or reduce your upfront investment and pay higher labor costs over time? Is it better to finance a new product by borrowing money or selling new shares of stock? Should you manufacture overseas where the production costs are lower or in your own country where political and transportation costs are lower? Once you make your choice, how do you know if you've made the right decision? Understanding and applying financial principles can help.

For example, consider Peloton, the leader in social exercising with its bike, treadmill, and yoga platforms. In 2012, the principal founder, John Foley, was inspired to start the company because he lacked the time to attend bicycle exercise classes due to his demanding career and growing family. He enjoyed cycling classes, but they could be expensive and often did not fit into his schedule. He recognized that the most popular instructors had developed a bit of a cult following and that the music playlist was a critical component for many followers. His choice of the company name, Peloton, comes from the French word for a "pack of bike riders," familiar to anyone who has even loosely followed the annual Tour de France bike race. The company name evokes a measure of mystique and prestige.

Peloton started small and underwent five funding rounds in seven years before the company went public with an initial public offering in September 2019. Foley and his friends had the idea that they were a "purposeful music company" and needed to touch on all aspects of the workout experience including the bike; video, audio, and music content; clothing design; competition among the riders; data gathering; and instructors for livestream and on-demand classes. They were selling an experience, not a bicycle. The equipment is expensive—a Peloton bike typically costs over $2,000. Peloton equips its studios with state-of-the-art camera and music systems and pays its instructors top dollar. Along the way, the founders made several critical financial decisions. They kept control of the firm by using private funding at the start.

How can we tell if Peloton has managed its resources well? The company started with $400,000 of funding to develop a prototype in 2012. By 2018, firm value increased to $4 billion with yet another round of private investor funding. As of April 2021, Peloton is a publicly traded company with a stock value of $34 billion. The executives are sacrificing profits in the short term to generate growth and long-term profitability. The firm uses its financial statements to identify sources and uses of funds, to test the effectiveness of advertising, and to forecast future profitability. Analysts like the firm, the stock price is up, and by many financial measures, Peloton has been a great success. Time will tell if the decisions made over the last several years will lead to long-term profitability or if the company has overinvested in marketing only to miss current and long-term profits.

(Sources: Viktor. "The Peloton Business Model—How Does Peloton Work & Make Money?" *Productmint*. Updated May 9, 2021. https://productmint.com/the-peloton-...on-make-money/. Accessed May 18, 2021; John Ballard. "If You Invested $5,000 in Peloton's IPO, This Is How Much Money You'd Have Now." *The Motley Fool*. June 6, 2020.

https://www.fool.com/investing/2020/...-is-how-m.aspx. Accessed May 18, 2021; Erin Griffith. “Peloton’s New Infusion Made It a $4 Billion Company in Six Years.” *New York Times*. August 3, 2018. www.nytimes.com/2018/08/03/t...n-6-years.html)

Footnotes

- 3Catherine Cote. “How and Why Managers Use Financial Statements.” *Business Insights*. June 16, 2020. https://online.hbs.edu/blog/post/how...ial-statements

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9.5: Careers in Finance

Learning Objectives

By the end of this section, you will be able to:

- Describe current job opportunities in finance.
- Describe the financial analyst role.
- Describe the business analyst role.

Job Opportunities in Finance: Market Trends

There are many career opportunities in the field of finance. The Bureau of Labor Statistics (BLS) finds that as of May 2020, the median income for finance-related positions was $72,250 versus the overall median income of only $41,950. Further, the BLS predicts that close to an additional 500,000 new finance- and accounting-related jobs will be created by 2029.[4] These new employment opportunities are in addition to the many openings that will become available as baby boomers continue to retire and leave the workforce.

Several of the BLS-listed finance careers do not even have finance or associated wording in the career titles. The BLS identifies finance skills as necessary for careers such as management analysts and market research analysts and work in logistics. Of course, many careers traditionally encourage the study of finance. These include job titles and descriptions such as these:

- Financial manager: Oversees aspects of and produces reports about an organization's financial needs, uses, and related activities
- Investment relations associate: Prepares and presents company financial data to investors and other company stakeholders
- Budget analyst: Reviews, plans, and evaluates an organization's financial activities
- Credit analyst: Reviews financial and related information to determine the creditworthiness of potential clients and customers; typically works at commercial and investment banks, credit unions, and rating firms such as Moody's or Standard and Poor's
- Financial analyst: Collects and examines data to plan future activities and evaluate past decisions
- Personal financial advisor: Provides advice to clients for short-, intermediate-, and long-term financial planning
- Loan officer: Helps individuals and organizations apply for loans and typically works for depository financial institutions such as commercial banks
- Insurance underwriter: Evaluates risk and establishes prices for insurance products such as life, property, and casualty insurance
- Financial examiner: Evaluates and monitors the activities of depository institutions in an effort to assure proper practice and behavior
- Finance professor: Teaches college classes, engages in economic and financial research, and provides community service by serving on boards and providing financial expertise

Link to Learning

Best Jobs in Finance

You can read more about possible careers in finance at the Balance Careers website.

Financial Analyst Roles

Many executive-level finance officers worked their way up via the role of financial analyst. Job descriptions vary across firms, industries, and government organizations. However, the role of financial analyst usually includes market research, financial forecasting, modeling, cost analysis, and comparative valuations. Financial analysts gather data and produce financial reports in conjunction with multiple departments within a business or organization. They rely on marketing and production personnel to provide accurate sales forecasts, and they work with accountants to create accurate financial reports.

As a financial analyst, you need strong spreadsheet skills, the ability to develop financial models and pro forma financial statements, outstanding analytical skills, and an overall understanding of business processes. Financial analysts possess a well-diversified collection of business and communication skills, both quantitative and qualitative. Figure 1.6 lists some tasks that

financial analysts must perform on a daily basis. Some firms require an MBA or several years of business experience for their financial analysts.



Figure 1.6: Financial Analyst Tasks

Internal financial analysts are important for a successful firm or organization because their work can lead to more efficient and cost-effective use of financial and nonfinancial resources. Responsibilities include keeping current with market conditions, developing financial models, reconciling variance between forecasts and outcomes, and serving as a resource for management. Financial analysts fulfill their responsibilities through the development and analysis of financial data including ratio analysis, trend analysis, in-depth discussions with division managers, and the presentation and interpretation of information at meetings and on electronic platforms.

External financial analysts use similar resources and tools to evaluate financial instruments as an aid to investment companies, investment and commercial bankers, and individual investors who rely on their published reports. Various government agencies also use financial analysts to aid in regulatory oversight and enforcement.

A report from a 2019 BLS survey determines that financial analysts earn an average salary of $81,590, and jobs are predicted to grow at a faster-than-average rate of 5% through 2029.[5]

Business (or Management) Analyst Roles

The job description for a business analyst looks much like that for a financial analyst. However, the strong quantitative skills required for a financial analyst are less emphasized in favor of overall strategic thinking. A successful business analyst is able to evaluate business opportunities by using analytical thinking, industry best practices, process development, team building and organization, and information technology. They then communicate optimal courses of action to executive decision makers to maximize value in alignment with the vision and goals of the firm.

Business analysts can help develop strategy and tactics to move a firm forward. They aid in identifying challenges and solutions. Data-driven solutions help get products to market more quickly, evaluate performance, and optimize production and product mix. The Bureau of Labor Statistics identifies the following as typical business analyst duties:

- Gathering information about problems to be solved or procedures to be improved
- Interviewing personnel and conducting onsite observations to determine the methods, equipment, and personnel that will be needed
- Analyzing financial data, revenues and expenditures, and employment reports, among other data
- Finding root causes for problems and proposing solutions that may include new systems, procedures, or personnel changes
- Presenting findings to decision makers
- Conferring with managers to ensure changes work

The average salary for management analysts was $85,260 in May 2019, and the BLS projects 11% growth, or about 94,000 new jobs, over the next decade.[6]

Footnotes

- 4U.S. Bureau of Labor Statistics. *Occupational Outlook Handbook*. www.bls.gov/ooh/business-and...ncial/home.htm
- 5Ibid.
- 6Ibid.

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9.6: Markets and Participants

Learning Objectives

By the end of this section, you will be able to:

- Identify primary and secondary markets.
- Identify key market players.

Primary and Secondary Markets

Simply put, the primary market is the market for “new” securities, and the secondary market is the market for “used” securities. Think of the primary market as equivalent to the sale of new cars and the secondary market as equivalent to the sale of used cars. In practice, many market locales trade both new and used securities. For example, the stock markets trade equity securities daily, and most of the trading takes place among individual and institutional investors who own shares in publicly traded companies. Trading a share of Amazon, Facebook, or Nike stock has little impact and no direct cash flow to the underlying firm. However, the information provided by such transactions is valuable, as it is a costly and public real-time statement by investors of their perceptions of firm’s value and a reflection of satisfaction and expectations.

Some, though many fewer, transactions in the equity market are for the purchase and sale of new securities. Firms issue new shares of stock called seasoned equity offerings (SEOs) or initial public offerings (IPOs) into the market. These are issues of new shares of stock, previously untraded, and their issuance sends cash flows directly to the underlying firms. SEOs are new shares issued by established firms, and IPOs are new shares issued by firms going public for the very first time. Once the initial transaction takes place, purchasers of these new securities may trade them. However, the second and subsequent trades are secondary, not primary, market transactions.

Extensive primary market transactions take place weekly, when the Treasury Department auctions billions of dollars of new Treasury securities. These new securities repay maturing Treasury securities and provide for the ongoing liquidity and long-term borrowing needs of the federal government. Again, subsequent trading of this government debt occurs as secondary market transactions.

Key Market Players

Key market players in finance include dealers, brokers, financial intermediaries, and you and me. Each of these players facilitates the exchange of products, information, and capital in different ways. The presence of these players makes financial transactions, easier, faster, and safer—essentially more efficient. You and your friends might engage in direct financial transactions, such as buying a coffee or borrowing money for a movie. These are typically small transactions. However, for transactions that are larger or more complicated, you need advanced financial entities with capital, expertise, and networks. The two segments of the secondary markets are broker markets and dealer markets, as Figure 1.7 shows. The primary difference between broker and dealer markets is the way each executes securities trades.

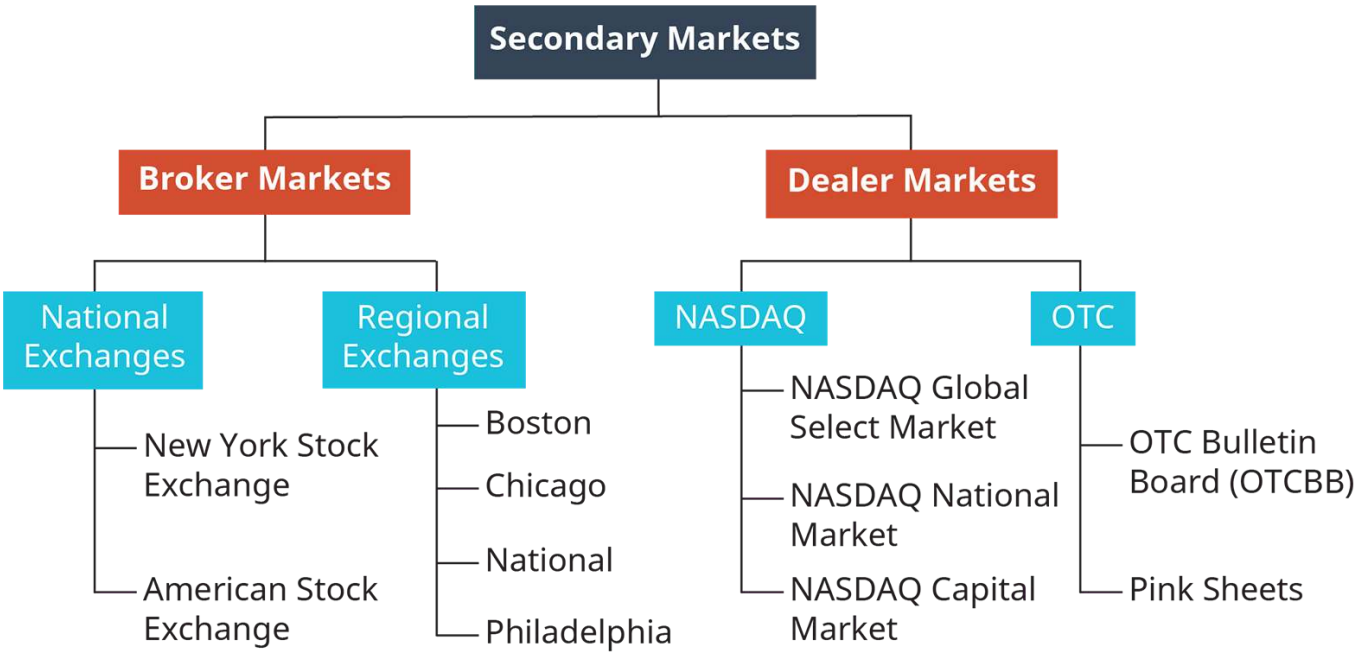


Figure 1.7: Broker and Dealer Markets

Dealers

Financial dealers own the securities that they buy or sell. When a dealer engages in a financial transaction, they are trading from their own portfolio. Dealers do not participate in the market in the same manner as an individual or institutional investor, who is simply trying to make their investments worth as much as possible. Instead, dealers attempt to "make markets," meaning they are willing and able to buy and sell at the current bid and ask prices for a security. Rather than relying on the performance of the underlying securities to generate wealth, dealers make money from the volume of trading and the spread between their bid price (what they are willing to pay for a security) and their ask price (the price at which they are willing to sell a security). By standing ready to always buy or sell, dealers increase the liquidity and efficiency of the market. Dealers in the United States fall under the regulatory jurisdiction of the Securities and Exchange Commission (SEC). Such regulatory oversight ensures that dealers execute orders promptly, charge reasonable prices, and disclose any potential conflicts of interest with investors.

Brokers

Brokers act as facilitators in a market, and they bring together buyers and sellers for a transaction. Brokers differ from dealers who buy and sell from their own portfolio of holdings. These firms and individuals traditionally receive a commission on sales.

In the world of stockbrokers, you may work with a discount broker or a full-service broker, and the fees and expenses are significantly different. A discount broker executes trades for clients. Brokers are required for clients because security exchanges require membership in the exchange to accept orders. Discount brokers or platforms such as Robinhood or E-Trade charge no or very low commissions on many of their trade executions, but they may receive fees from the exchanges. They also do not offer investment advice.

Full-service brokers offer more services and charge higher fees and commissions than discount brokers. Full-service brokers may offer investment advice, retirement planning, and portfolio management, as well as execute transactions. Morgan Stanley and Bank of America Merrill Lynch are examples of full-service brokers that serve both institutional and individual investors.

Financial Intermediaries

A financial intermediary, such as a commercial bank or a mutual fund investment company, serves as an intermediary to enable easier and more efficient exchanges among transacting parties. For instance, a commercial bank accepts deposits from savers and investors and creates loans for borrowers. An investment company pools funds from investors to inexpensively purchase and manage portfolios of stocks and bonds. These transactions differ from those of a dealer or broker. Brokers facilitate trades, and dealers stand ready to buy or sell from their own portfolios. Financial intermediaries, however, accept money from investors and

may create a completely different security all together. For example, if the borrower defaults on a mortgage loan created by the commercial bank where you have your certificate of deposit, your investment is still safely earning interest, and you are not directly affected.

Financial institutions usually facilitate financial intermediation. However, occasionally lenders and borrowers are able to initiate transactions without the help of a financial intermediary. When this occurs on a large scale, the process, known as disintermediation, can cause much turmoil in the financial markets. In the 1970s, inflation rose above 10% on an annual basis, and yet commercial banks were limited to offering maximum rates of 5% on their savings deposits.[7] Savers bypassed banks and savings and loan associations to invest directly into Treasury securities and other short-term marketable securities. This lack of deposit funds and the subsequent behavior of the industry essentially eliminated the savings and loan industry and led to significant deregulation of commercial and investment banking in the United States.

The advantages of a robust network of financial intermediaries are many. They add efficiency to the financial system through lower transaction costs. They gather and disperse information to minimize financial abuse and fraud. They provide economies of scale and specialized knowledge. Finally, financial intermediaries are critical for the functioning of a capitalist economy.

Footnotes

- 7United States President and Council of Economic Advisers. “The 1970s: Inflation, High Interest Rates, and New Competition.” *Economic Report of the President*. 1991. https://fraser.stlouisfed.org/files/..._1990-1994.pdf

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9.7: Microeconomic and Macroeconomic Matters

Learning Objectives

By the end of this section, you will be able to:

- Define microeconomics and macroeconomics.
- Discuss the relationship between microeconomics and macroeconomics.
- Explain the importance of macroeconomic variables in finance markets.

Microeconomics

In the business setting, finance is the intersection of economics and accounting. Financial decision makers rely on economic theory and empirical evidence combined with accounting data to make informed decisions for their organization. Economics is the study of the allocation of scarce resources. Economists attempt to understand the how and why of human and financial capital allocation to governments, businesses, and consumers.

We typically separate economics into two major areas, microeconomics and macroeconomics. Microeconomics is devoted to the study of these decisions of allocation by individual businesses, persons, or organizations. Microeconomics helps us understand incentives and behavior, consumer choices and consumption, and supply and demand.

Our understanding of microeconomics aids in financial forecasting, planning, and budgeting by understanding how individuals are likely to respond to changes in product or service functionality, price, supply, quality, marketing, or other firm-induced stimulus. Empirical research by individuals, businesses, academics, and government provide evidence of what is going on and suggest what may change or stay the same.

Macroeconomics

Whereas microeconomics studies the decisions of individuals, macroeconomics examines the decisions of groups. Macroeconomic areas of study and concern include inflation, income, economic growth, and unemployment. When Bacon Signs developed a financial and operating plan to expand the business, the firm had to consider unemployment and inflation when estimating its price of labor and materials. Bacon Signs also had to consider interest rates when estimating the cost of borrowing money to expand the business.

Macroeconomic modeling is limited because models cannot capture every variable in testing and application. However, financial forecasting must incorporate macroeconomic assumptions and expectations into individual firm and industry forecasts. Economic Foundations expands on our discussion of micro- and macroeconomics.

Importance of Macroeconomic Variables in Financial Markets

To make financial forecasts, managers need good information to understand the relationship among several economic variables. Working from small to large, sales forecasts estimate the likely price and quantity of goods sold. In doing so, the forecaster will consider local, regional, state, national, and international economic conditions. Inflation is an important macroeconomic variable that influences prices. Every quarter, financial information hubs, such as the Wall Street Journal (WSJ), and government agencies and regulatory bodies, such as the Treasury Department and the Federal Reserve, release estimates about expected and current inflation. This information informs policy makers how to adjust the money supply to meet target objectives. Financial forecasters pay close attention to current and expected interest rates, as they have a fundamental impact on the cost of raising money and determining the required rate of return for investment.

The unemployment rate helps inform financial forecasters about the expected cost of labor and the ability of employers to hire people if a firm plans to increase the production of goods or services. The stock market is a forward-looking macroeconomic variable and measures investor expectations about future cash flows and economic growth. Political economic variables such as changes in regulation or tax policy can also affect forecasting models.

Link to Learning

Politics and Stock Markets

Politics and stock market returns make for heated conversations. Who can run the country's economic system better, Republicans or Democrats? Presidents often take the credit or blame for overall economic performance even though their actual influence is less than you might think. See this fun comparison chart of political economic performance that measures stock market returns by each administration going back to President Warren Harding in 1920. Who had the highest overall increase in the market? What president in the 21st century oversaw an overall decline in the market? Just to get things going, who had better overall market returns after four years in office, Donald Trump or Barack Obama?

Each of the variables we have identified—inflation, interest rates, unemployment, economic growth, the stock market, and government fiscal policy—are macroeconomic factors. They are beyond the scope and influence of individual firms, but combined, they play a critical role in establishing the market in which firms compete. A better understanding of the interaction of these macro variables with each other and with individual micro or firm-specific variables can only strengthen financial forecasting and management decision-making.

Concepts In Practice

Here, There, and Everywhere: Where Did Your iPhone Come From?

How do international macroeconomic factors affect investment decisions for businesses and individuals? Foreign investment adds risk and potential return to the decision-making process. Macroeconomic factors such as different inflation rates, unexpected changes in currency exchange rates, and mismatched economic growth all add to the uncertainty of making investments abroad. Just as important are government regulations limiting pollution, exploitation of precious minerals, labor laws, and tariffs. Toss in a pandemic, and a bottleneck or two, and suddenly international macroeconomic factors can affect almost every aspect of commerce and international trade.

For example, how far did your new iPhone travel before it got into your hands? Apple is an American company headquartered in Cupertino, California, and worth over $2 trillion.[8] However, your phone may have visited as many as six continents before it reached you. Each location touched by the Apple corporate hand requires an understanding of the financial impact on the product cost and a comparison with alternative designs, resources, suppliers, manufacturers, and shippers. This is where finance can get really fun!

(Sources: Magdalena Petrova. "We Traced What It Takes to Make an iPhone, from Its Initial Design to the Components and Raw Materials Needed to Make It a Reality." *CNBC*. December 14, 2018. https://www.cnbc.com/2018/12/13/insi...come-from.html; Natasha Lomas. "Apple's Increasingly Tricky International Trade-offs." *TechCrunch*. January 6, 2019. https://techcrunch.com/2019/01/06/ap...al-trade-offs/; Kif Leswing. "Here's Why Apple Is So Vulnerable to a Trade War with China." *CNBC*. May 13, 2019. https://www.cnbc.com/2019/05/13/why-...ith-china.html)

Relationship between Microeconomics and Macroeconomics

In the parable, a group of blind people happen upon an elephant for the first time, and they each touch one part—but one part only—of the elephant. Subsequently, when they each describe what they have discovered, the descriptions are vastly different. The group's members become upset, accusing one another of inaccurate descriptions or worse. The parable demonstrates how individuals can make absolute truths from their own limited and subjective information. Financial decision makers run a similar risk, if they choose to recognize only their own findings and ignore other microeconomic or macroeconomic information and the interaction of these factors.

A common view to understanding economics states that macroeconomics is a top-down approach and microeconomics is a bottom-up approach. Financial decision makers need to see both the forest and the individual trees to chart a course and move toward a strategic objective. They need both the macro data, so important for strategic thinking, and the micro data, required for tactical movement. For example, the national rate of unemployment may not have been much help when Bacon Signs was searching for skilled laborers who could form neon signs. However, the unemployment rate helped inform the company about the probability of demand for new businesses and the signs they would need.

Footnotes

- 8Sergei Klebnikov. “Apple Becomes First U.S. Company Worth More Than $2 Trillion.” *Forbes*. August 19, 2020. https://www.forbes.com/sites/sergeik...an-2-trillion/

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9.8: Financial Instruments

Learning Objectives

By the end of this section, you will be able to:

- Differentiate between money and capital markets.
- List money market instruments.
- List capital market instruments.

Money Markets and Instruments

The money market is the market for short-term, low-risk, highly liquid securities. “Short-term” refers to money market securities having maturities of less than one year–sometimes as short as overnight. “Low risk” specifically means that the probability of default by the issuer in very unlikely. Defaulting on money market instruments is not unheard of, but it is very rare. “High liquidity” means that money market instruments can generally be sold in a secondary market very quickly and at or near their current market value. Finally, money market securities are homogeneous, meaning that within an issue of securities, a single instrument is not unique. For example, if you purchase 13-week T-bills issued in the first week of January, each bill is identical to any other in the issue. Compare that to the purchase of physical assets such as a car or house, where each of the assets sold has some unique feature or measure of quality.

Financial institutions, corporations, and governments that have short-term borrowing and/or lending needs issue securities in the money market. Most of the transactions are quite large, with typical amounts in excess of $100,000. These large transactions are the norm when trading federal funds, repurchase agreements, commercial paper, or negotiable certificates of deposit. Our sample company, Bacon Signs, was much too small to participate directly in the money market. However, Bacon Signs’ borrowing rates were affected by changes in the money market. Treasury bills are also a very important component of the money market, and they trade in smaller amounts starting at $10,000 per T-bill.

Treasury bills (T-bills), are short-term debt instruments issued by the federal government. T-bills are auctioned weekly by the Treasury Department through the trading window of the Federal Reserve Bank of New York. The federal government uses T-bills to meet short-term liquidity needs. T-bills have very short maturities and a broad secondary market and are defau -financial-instruments#foot-00001">9

Commercial paper (CP) is a short-term, unsecured debt security issued by corporations and financial institutions to meet short-term financing needs such as for inventory and receivables. For example, credit card companies use commercial paper to finance credit card payments. Commercial paper has a maturity of one to 270 days. The short maturity reduces SEC oversight. The lesser oversight and the unsecured nature of CP means that only highly rated firms are able to issue the uninsured paper. The default rate on commercial paper is typically low, but default rates did increase into the double-digit range during the financial crisis of 2008.

Commercial paper typically carries a minimum face value of $100,000 and sells at a discount with the face value as the repayment amount. Corporations and financial institutions, not the government, issue commercial paper; thus, returns are taxable. Further, unlike T-bills, there is not a robust secondary market for CP. Most purchasers are large, such as mutual fund investment companies, and they tend to hold commercial paper until maturity.

Negotiable certificates of deposit (NCDs) are very large CDs issued by financial institutions. They are redeemable only at maturity, but they can and often do trade prior to maturity in a broad secondary market. NCDs, or *jumbo CDs*, are so called because they sell in increments of $100,000 or more. However, typical minimums amounts are $1,000,000 with a maturity of two weeks to six months.

NCDs differ in some important ways from the typical CD you may be familiar with from your local bank or credit union. The typical CD has a maturity date, interest rate, and face amount and is protected by deposit insurance. However, if an investor wishes to cash out prior to maturity, they will incur a substantial penalty from the issuer (bank or credit union). An NCD also has a maturity date and amount but is much larger than a regular CD and appeals to institutional investors. The principal is not insured. When the investor wishes to cash out early, there is a robust secondary market for trading the NCD. The issuing institution can

offer higher rates on NCDs compared to CDs because they know they will have use of the purchase amount for the entire maturity of the NCD. The reserve requirements on NCDs by the Federal Reserve are also lower than for other types of deposits.

The market for federal funds is notable because the Federal Reserve targets the equilibrium interest rate on federal funds as one of its most important monetary policy tools. The federal funds market traditionally consists of the overnight borrowing and lending of immediately available funds among depository financial institutions, notably domestic commercial banks. The participants in the market negotiate the federal funds interest rate. However, the Federal Reserve effectively sets the target interest rate range in the federal funds market by controlling the supply of funds available for use in the market. Many of the borrowing and lending rates in our economy are a direct function of the federal funds rate.

Capital Markets and Instruments

The capital market is the market for longer-term financial instruments. The capital market is similar to the money market. However, maturities are longer, default risk varies to a greater degree from low to high, and liquidity is less certain, as is the homogeneity of the financial instruments. Broadly, we separate capital market instruments into debt instruments traded in the bond markets and equity securities traded on the stock markets.

The federal government issues Treasury notes and bonds to raise money for current spending and to repay past borrowing. The size of the Treasury market is quite large, as the US federal government over the years has accumulated a total indebtedness of over $28 trillion.[10]

Treasury notes are US government debt instruments with maturities of 2 to 10 years. The Treasury auctions notes on a regular basis, and investors may purchase new notes from TreasuryDirect.gov in the same way they would a T-bill. T-notes differ from T-bills in that they are longer term, pay semiannual coupon interest payments, and pay the par or face value of the note at maturity. Upon issue of a note, the size, number, and timing of note payments is fixed. However, prices do change in the secondary market as interest rates change. Like T-bills, T-notes are generally exempt from state and local taxes. There is an active secondary market for Treasury notes.

Longer-term Treasury issues, Treasury bonds, have maturities of 20 or 30 years. T-bonds are like T-notes in that they pay semiannual coupon interest payments for the life of the security and pay the face value at maturity. They are longer term than notes and typically have higher coupon rates.

State and local governments and taxing districts can issue debt in the form of municipal bonds (“munis”). Local borrowing carries more risk than Treasury securities, and default or bankruptcy is unlikely but possible. Thus, munis have ratings that run a spectrum similar to that of corporate bonds in that they receive a bond rating based on the perceived default risk. The defining feature of municipal bonds is that some interest payments are tax-free. Interest on munis is always exempt from federal taxes and sometimes exempt from state and local taxes. This makes them very attractive to investors in high income brackets.

Just as governments borrow money in the long-term from investors, so do corporations. A corporation often issues bonds for longer-term financing. Bond contracts identify very specific terms of agreement and outline the rules for the order, timing, and amount of contractual payments, as well as processes for when one or more of the required activities lapse. A bond contract, known as an indenture, includes both standard “boilerplate” contract language and specific conditions unique to a particular issue. Because of these non-standardized features of a bond contract, the secondary market for trading used bonds typically requires a broker, dealer, or investment company to facilitate a trade.

An important goal of business executives is to maximize the owners’ wealth. For corporations, shares of stock represent ownership. Stocks are difficult to price compared to bonds. Bonds have contracts that specify the number and amount of all payments made by the firm to the purchasers of bonds. Stock cash flows are far more uncertain than bond cash flows. Stocks might or might not have periodic dividend payments, and an investor can plan to sell the stock at some point in the future. However, no contract guarantees the size of the dividends or the time or resale price of the stock. Thus, the cash flows from stock ownership are more uncertain and risky than cash flows from bonds.

Ownership of corporations is easily transferable if a company’s stock trades in one of the organized stock exchanges or in the over-the-counter (OTC) market. Most of the trading consists of used or previously issued stocks in the over-the-counter market and organized exchanges. The two largest stock exchanges in the world are the New York Stock Exchange (NYSE) and the NASDAQ. Both exchanges are located in the United States.

Footnotes

- 9Henrik Bessembinder, Chester Spatt, and Kumar Venkataraman. “A Survey of the Microstructure of Fixed-Income Markets.” *Journal of Financial and Quantitative Analysis*. February 2020. www.sec.gov/spotlight/fixed-...ome-market.pdf
- 10Trading Economics. “United States Government Debt.” *Trading Economics*. tradingeconomics.com/united-...overnment-debt

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9.9: Concepts of Time and Value

Learning Objectives

By the end of this section, you will be able to:

- Explain the impact of time on saving and spending.
- Describe economic value.

Many students don't have a choice between saving and spending. College is expensive, and it is easy to spend every dollar you earn and to borrow to meet the rest of your obligations. Businesses, however, continually make decisions about when and how much money to borrow or invest. Bacon Signs established banking relationships to borrow money when needed to expand the business or a product line. Sometimes the best decision is to invest as soon as possible to grab opportunities, and other times it is better to delay new investment in order to pay dividends to the owners of the company.

Link to Learning

The Dow Jones Industrial Average Marches On!

Once you begin to save and invest, here is a "fun fact" about the Dow Jones Industrial Average (DJIA), also known as the Dow 30. It first appeared on May 26, 1896, as a quick way for stock traders to assess if the stock market had gone "up or down" each day and by how much. Here we are over 100 years later, and the Dow 30 index is alive and well. Of course, the 30 companies have changed, but the index does represent a continuous yardstick to measure stock performance over time. As Table 1.1 shows, it took from 1906 to 1972, or a little over 66 years, for the Dow 30 to increase tenfold, from a value of 100 to a value of 1,000. The next tenfold increase from 1,000 to 10,000 took only a little under 27 years from 1972 to 1999. Time will tell if or when the Dow 30 will top 100,000 at the closing bell.

Table 1.1: The Dow 30 Closing Milestones and Dates

Closing Milestones	Date
41	5/26/1896
100	1/12/1906
1,000	11/14/1972
10,000	3/29/1999
20,000	1/25/2017
30,000	11/24/2020

Impact of Time on Saving and Spending

The choice to spend or save and invest is really a choice between consumption today versus consumption in the future. Economists, investment advisers, your friends, and mine love to discuss the trade-off of consumption now or later—even if not in those words. We have all heard conversations that go something like this: "Let's go grab a beer—you can study for tomorrow's exam in the morning." Or "My father's investment adviser told me that if I invest $500 per month for the next 30 years and earn an annual rate of 10% on my investments, I will have invested $180,000 over time but accumulated an investment portfolio worth over $1.13 million!"

An important aspect of the trade-off between saving and spending involves your short-, intermediate-, and long-term goals. Delaying consumption until later comes with risks. Will your consumption choices still be available? Will the prices be attainable? Will you still be able to consume and enjoy your future purchases?

When saving for short-term objectives, the safety of the principal invested is important, and the value of compounding returns is minimal compared to longer-term investments. Most short-term investors have a low tolerance for risk and hope to beat the rate of inflation with a little extra besides. An example could be to start a holiday savings account at your local bank as a way to save, earn a small rate of return, and assure that you have funds set aside for consumption at the end of the year.

An intermediate investment may be to save for a new car or for the down payment on a house or vacation home. Again, maintaining the principal is important, but you have some time to recover from poor investment returns. Intermediate-term investments tend to earn higher average annual rates of return than short-term investments, but they also have greater uncertainty and risk.

Long-term investments have the advantage of enough time to recover from temporary poor performance and the luxury of compounded returns over a long period. Further, long-term investments tend to have greater risk and higher expected average annual rates of return. Even though this is a business finance text, sometimes a personal finance example is easier to relate to. To illustrate, Table 1.2 demonstrates four different investment scenarios. In scenario 1, you invest $5,000 annually from ages 26 through 60 into an account earning an average annual rate of return of 10% per year. Over your lifetime, you invest a total of $175,000, and at age 60, you have an estimated portfolio value of $1,490,634. This is a healthy amount that has almost certainly beaten the average annual rate of inflation. In scenario 1, by investing regularly, you accumulate roughly 8.5 times the value of what you invested. Congratulations, you can expect to become a millionaire!

Compare your results in scenario 1 with your college roommate in scenario 2, who is able to invest $5,000 per year from ages 19 through 25 and leave her investments until age 60 in an account that continues to earn an annual rate of 10%. She makes her investments earlier than yours, but they total only $35,000. However, despite a much smaller investment, her head start advantage and the high average annual compounded rate of return leave her with an expected portfolio value of $1,466,369. Her total is almost as great as the amount you would accumulate, but with a much smaller total investment.

Scenarios 3 and 4 are even more dramatic, as can be seen from a review of Table 1.2. In both scenarios, only five $5,000 investments are made, but they are made earlier in the investor's life. Parents or grandparents could make these investments on behalf of the recipients. In both scenarios, the portfolios grow to amounts greater than those of you or your roommate with smaller total investments. The common factor is that greater time leads to additional compounding of the investments and thus greater future values.

Table 1.2: Four Investment Scenarios: Assumptions and Expected Outcomes

	Average Annual Rate of Return = 10%			
Assumptions	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Starting investment age	26	19	14	9
Ending investment age	60	25	18	13
Total investments	35	7	5	5
Annual investment	$5,000	$5,000	$5,000	$5,000
Total investment amount	$175,000	$35,000	$25,000	$25,000
Value at age 60	$1,490,634	$1,466,369	$1,838,858	$2,961,500

Definition of Economic Value

Value is a term used frequently in business and especially in economics, accounting, and finance. Accountants track, record, and display value in the form of financial statements and footnotes. The numbers they present are "book values" and represent what has occurred. Financial people like to speak in terms of "market values." Market values are calculated using expected future cash flows discounted to today. Market values are the prices that consumers pay for a product. Economic value is what we believe consumers are actually willing to pay for a product, service, or experience. For example, the price of a movie ticket may be $10, but there are individuals who are willing to pay far more for the experience of watching a movie on the big screen.

Generally, the economic value is at least as great as the market value or current price of an asset. When Bacon Signs planned for the future, the firm attempted to determine the economic value of its products when creating an optimal mix of price and quantity sold. Firms that produce unique products for clients may have multiple prices based on the estimated economic value of their good or service to the client. One way to think about the difference between market value and economic value is that market value is what you have to pay, while economic value is what you are willing to pay.

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9.10: Summary

1.1 What Is Finance?

Finance is the study of the trade-off between risk and expected return. There are three broad areas of finance: business finance, investments, and financial markets and institutions.

1.2 The Role of Finance in an Organization

The accounting department creates financial statements, and the finance department implements the firm's policy objectives, monitors results, and responds to necessary strategic and tactical changes. Finance is responsible for budgeting and forecasting. Finance aids in establishing firm objectives and is responsible for meeting with creditors, lenders, owners, regulators, and other stakeholders that provide capital to the firm or have a claim against firm assets.

1.3 Importance of Data and Technology

Much of the data used in business today has been available for many years. However, data today is more attainable than ever due to technological advancements facilitating a user's ability to gather, evaluate, and store information faster and more cost effectively than ever. Information is continually available, so the quicker and less expensively firms can adjust to the arrival of new information, the more valuable they become for their stakeholders.

1.4 Careers in Finance

Careers in finance are plentiful, fulfilling, and well compensated. Introductory positions are available in areas such as data collection and data entry. More skill and experience is required for roles such as data analysis and forecasting. Eventually, executive-level positions such as CFO present themselves to the most qualified. Finance careers are not limited to financial firms, as understanding finance is an important skill in government regulatory positions, nonprofit management, and all types of commercial business—from real estate, to retail, to manufacturing, to education.

1.5 Markets and Participants

Financial markets are where buyers and sellers of financial securities come together to trade. The trading of securities allows markets to value assets and signal value as new information arrives. Brokers operate to bring buyers and sellers together and receive commissions. Dealers trade from their own portfolios and are often willing to make markets for specific securities by agreeing to buy or sell at the current bid and ask prices. Financial intermediaries actually change or create new financial products.

1.6 Microeconomic and Macroeconomic Matters

Economics is the study of the allocation of scarce resources. Economists attempt to understand the how and why of human, physical, and financial capital allocation. Microeconomics is the study of factors affecting an individual's consumption, and macroeconomics is the study of all the aggregate factors affecting an economy. Economics is important in finance due to the number of economic variables critical to good financial forecasting.

1.7 Financial Instruments

Maturity is one method to differentiate among financial instruments. Using this methodology, we have money markets and capital markets. Money markets consist of short-term marketable securities, and capital markets focus on longer-term securities such as bonds and stocks.

1.8 Concepts of Time and Value

The concepts of time and value involve the resolution of conflict between consumption now versus consumption later. Time and value represent the trade-off between risk and expected return. Many financial exercises examine the relationships among time, interest rates, risk, cash flows now, and cash flows in the future. You can expect to solve several "time value of money" problems before you complete this book.

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9.11: Key Terms

brokers
individuals or a firm that brings together potential buyers and sellers of a product and receives a commission at transaction

business finance
the study and application of how managers can apply financial principles to maximize the value of a firm in a risky environment

capital budgeting
the process of determining which long-term or fixed assets to acquire in an effort to maximize shareholder value

capital market
market for longer-term financial instruments, such as stocks and bonds, used to finance long-term projects for organizations

capital structure
the mix of financing, usually debt and equity, used by a firm

chief financial officer (CFO)
an executive-level officer who sets policy for working capital management, determines optimal capital structure for the firm, and makes the final decision in matters of capital budgeting

commercial paper (CP)
short-term, unsecured financial obligations issued by firms as a means of short-term financing for items such as inventory or payables

comptroller
also referred to as *controller*, individual in charge of financial reporting and the oversight of the accounting activities necessary to develop financial reports

dealers
facilitate a market and the trading of securities by holding a portfolio of the underlying asset for easy purchase and sale; earn money on the spread between ask and bid prices for the asset

default risk
the risk that the issuer of a financial security will be unable to make payments as specified in the terms of a financial contract

diversifiable risk
also called *unsystematic risk*, a risk that can be eliminated without the loss of expected return by holding a portfolio of securities

economic value
the amount a consumer is willing to pay for a particular asset or service, usually greater than or equal to the current market price or present value of the asset

federal funds rate
the rate targeted by the Federal Reserve in the implementation of monetary policy

financial industry regulatory authority (FINRA)
an independent, nongovernmental organization that writes and enforces the rules governing registered brokers and broker-dealer firms in the United States

financial intermediary

a commercial bank or a mutual fund investment company that serves as an intermediary to enable easier and more efficient exchanges among transacting parties, often accepting one form of financial asset from which they create another, such as taking demand deposits to create mortgage loans

financial markets and institutions

one of the three main areas of the field of finance; firms and regulatory agencies that oversee our financial system

inflation risk

the risk of reduced purchasing power of goods and services due to rising prices

investments

one of the three main areas of finance; products and processes used to create individual and institutional portfolios with the intent of growing wealth

money market

the market for short-term, low-risk, highly liquid, homogeneous financial securities; common money market securities include T-bills, NCDs, and commercial paper

money market mutual funds

created by investment companies to pool the money of many investors to purchase and then manage short-term, low-risk, liquid financial portfolios of securities

municipal bonds (munis)

long-term debt obligations issued by state or local governments that often have important tax advantages relative to corporate bonds

negotiable certificate of deposit

very large CDs issued by financial institutions, redeemable only at maturity but can and often do trade prior to maturity in a broad secondary market; also called *jumbo CDs* because they sell in increments of $100,000 or more

non-diversifiable risk

risk that cannot be eliminated by simply holding a portfolio of securities; also known as systematic risk

political risk

the risk of local, state, or national governments “changing the rules” and disrupting firm cash flows

primary market

a term used in financial markets to identify the market for the purchase and sale of new securities

secondary market

a term used in financial markets to represent the purchase or sale of used securities that trade after the initial sale by the offering firm

Securities Investor Protection Corporation (SIPC)

a nonprofit corporation that provides brokerage customers up to $500,000 coverage for cash and securities held by the firm

treasurer

position responsible for monitoring cash flow at a firm and frequently is the contact person for bankers, underwriters, and other outside sources of financing

Treasury bills (T-bills)

short-term debt obligations of one year or less issued by the US government

Treasury bonds

long-term debt obligations issued by the US government characterized by having maturities of greater than 10 years and making periodic interest payments as well as principal payment at maturity

Treasury notes

long-term debt obligations issued by the US government characterized by having maturities of 2 to 10 years and making periodic interest payment as well as principal payment at maturity

working capital management

the development, oversight, and management of a firm’s short-term assets and liabilities

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CHAPTER OVERVIEW

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10.3: Patterns of Unemployment

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10.1: Introduction to Unemployment



Figure 8.1 Out of Business Borders was one of the many companies unable to recover from the 2008-2009 economic recession. (Credit: modification of "Factory Automation Robotics Palettizing Bread" by KUKA Roboter GmbH/Wikimedia Commons, Public Domain)

Chapter Objectives

In this chapter, you will learn about:

- How Economists Define and Compute Unemployment Rate
- Patterns of Unemployment
- What Causes Changes in Unemployment over the Short Run
- What Causes Changes in Unemployment over the Long Run

Bring It Home

Unemployment and the COVID-19 Pandemic: A Complicated Story

It was the most abrupt economic change in the post-World War II era. Between March 2020 and April 2020, the U.S. unemployment rate increased from 4.4% to 14.8%. As a result of the COVID-19 pandemic, millions of people were left without work as businesses shut down and people stayed home and cut their spending, especially on restaurants, tourism, and travel. As confidence and spending were slowly restored, and as the situation with the virus steadily improved, unemployment began to tick down. By 2022, with the availability of vaccines and boosters and other improved health measures, things were better still, but the presence of dangerous variants prevented a full return to normal.

The COVID-19 pandemic had other effects on the labor market as well. Labor force participation—the rate at which people are employed or actively searching for work—declined and as of early-2022 remained lower than it was in 2019. Some were forced to stop working because of school and childcare closures. Others were concerned about how safe their workplaces would be in the middle of a global pandemic. And still others simply chose to retire early. Labor force participation remains a sore spot in the labor market's recovery.

These two statistics—unemployment and labor force participation—show how complicated the labor market can be. As the unemployment rate declined through 2021, the disappointing statistics on labor force participation show weak points. One day you may have read a headline about how easy it was to find a job, and the next day a headline would describe how difficult it was for employers to find workers. By the end of this chapter, you will be in a much better position to make sense of these events.

Unemployment can be a terrible and wrenching life experience—like a serious automobile accident or a messy divorce—whose consequences only someone who has gone through it can fully understand. For unemployed individuals and their families, there is the day-to-day financial stress of not knowing from where the next paycheck is coming. 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. However, unemployment also includes economic costs to the broader society. When millions of unemployed but willing workers cannot find jobs, economic resource are 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 the unemployed workers could have produced.

This chapter will discuss how economists define and compute the unemployment rate. It will examine the patterns of unemployment over time, for the U.S. economy as a whole, for different demographic groups in the U.S. economy, and for other countries. It will then consider an economic explanation for unemployment, and how it explains the patterns of unemployment and suggests public policies for reducing it.

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10.2: How Economists Define and Compute Unemployment Rate

Learning Objectives

By the end of this section, you will be able to:

- Calculate the labor force participation rate and the unemployment rate
- Explain hidden unemployment and what it means to be in or out of the labor force
- Evaluate the collection and interpretation of unemployment data

Newspaper or television reports typically describe unemployment as a percentage or a rate. A recent report might have said, for example, *from September 2021 to October 2021, the U.S. unemployment rate declined from 4.8% to 4.6%*. At a glance, the changes between the percentages may seem small. However, remember that the U.S. economy has about 162 million adults (as of the beginning of 2022) who either have jobs or are looking for them. A rise or fall of just 0.1% in the unemployment rate of 162 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. In April 2020, at the peak of the pandemic-induced recession, over 20 million people were out of work. Even with the unemployment rate at 4.2% in November 2021, about 7 million people who were looking for jobs were out of 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 we count everyone without a job as unemployed? Of course not. For example, we should not count children as unemployed. Surely, we should not count the retired 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.

The point is that we do not just divide the adult population 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 discouragement due to 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 or not in the labor force.

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 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 work and not actively looking for a job

Labor force: the number of employed plus the unemployed

Calculating the Unemployment Rate

Figure 8.2 shows the three-way division of the 16-and-over population. In January 2017, about 62.9% of the adult population was "in the labor force"; that is, people are either employed or without a job but looking for work. We can divide those in the labor force into the employed and the unemployed. Table 8.1 shows those values. 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:

$$\text{Unemployment rate} = \frac{\text{Unemployed people}}{\text{Total labor force}} \times 100$$

Unemployment rate=Unemployed peopleTotal labor force × 100

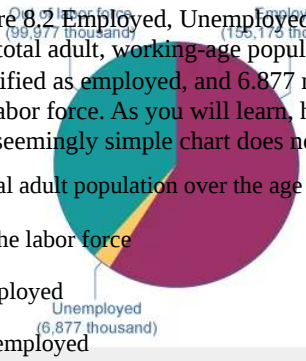


Figure 8.2 Employed, Unemployed, and Out of the Labor Force Distribution of Adult Population (age 16 and older), January 2021

The total adult, working-age population in January 2021 was 262.029 million. Out of this total population, 155.175 million were classified as employed, and 6.877 million were classified as unemployed. The remaining 99.977 million were classified as out of the labor force. As you will learn, however, this seemingly simple chart does not tell the whole story. As you will learn, however, this seemingly simple chart does not tell the whole story.

Total adult population over the age of 16	262.029 million
In the labor force	162.052 million (59.2%)
Employed	155.175 million
Unemployed	6.877 million
Out of the labor force	99.977 million (38.2%)

Table 8.1 U.S. Employment and Unemployment, November 2021 (Source: data.bls.gov)

In this example, we can calculate the unemployment rate as 7.635 million unemployed people divided by 159.716 million people in the labor force, which works out to a 4.8% rate of unemployment. The following Work It Out feature will walk you through the steps of this calculation.

Work It Out

Calculating Labor Force Percentages

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 8.1 to illustrate the steps.

To determine the percentage in the labor force:

Step 1. Divide the number of people in the labor force (159.716 million) by the total adult (working-age) population (254.082 million).

Step 2. Multiply by 100 to obtain the percentage.

Percentage out of the labor force=159.716254.082=0.6286=62.9%Percentage out of the labor force=159.716254.082=0.6286=62.9%

To determine the percentage out of the labor force:

Step 1. Divide the number of people out the labor force (94.366 million) by the total adult (working-age) population (254.082 million).

Step 2. Multiply by 100 to obtain the percentage.

Percentage in the labor force=94.366254.082=0.3714=37.1%Percentage in the labor force=94.366254.082=0.3714=37.1%

To determine the unemployment rate:

Step 1. Divide the number of unemployed people (7.635 million) by the total labor force (157 million).

Step 2. Multiply by 100 to obtain the rate.

Unemployment rate=7.635159.716=0.0478 =4.8%Unemployment rate=7.635159.716=0.0478 =4.8%

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 they are looking for full time and permanent employment that are counted as employed, although they are not employed in the way they would like or need to be. Additionally, there are individuals who are underemployed. This includes those who are trained or skilled for one type or level of work but are working in a lower paying job or one that does not utilize their skills. For example, we would consider an individual with a college degree in finance who is working as a sales clerk 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. Using the data in Figure 8.2 and Table 8.1, those included in this calculation would be the 162.052 million individuals in the labor force. We calculate the rate by taking the number of people in the labor force, that is, the number employed and the number unemployed, divided by the total adult population and multiplying by 100 to get the percentage. For the data from November 2021, the labor force participation rate is 61.8%. Historically, the civilian labor force participation rate in the United States climbed beginning in the 1960s as women increasingly entered the workforce, and it peaked at just over 67% in late 1999 to early 2000. Since then, the labor force participation rate has steadily declined, slowly to about 66% in 2008, early in the Great Recession, and then more rapidly during and after that recession. The labor force then climbed slowly during the 2010s but declined again during the pandemic in March–April 2020 and remained lower than pre-pandemic levels as of early 2022.

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. The payroll survey is based on a survey of about 147,000 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.

How Does the U.S. Bureau of Labor Statistics Collect the U.S. Unemployment Data?

The unemployment rate announced by the U.S. Bureau of Labor Statistics on the first Friday of each month for the previous month is based on the Current Population Survey (CPS), which the Bureau has carried out every month since 1940. The Bureau takes great care to make this survey representative of the country as a whole. The country is first divided into 3,137 areas. The U.S. Bureau of the Census then selects 729 of these areas to survey. It divides the 729 areas into districts of about 300 households each, and divides each district 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. Employees interview households for four consecutive months, then rotate them out of the survey for eight months, and then interview them again for the same four months the following year, before leaving the sample permanently.

Based on this survey, state, industry, urban and rural areas, gender, age, race or ethnicity, and level of education statistics comprise components that contribute to unemployment rates. 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 Current Population Survey is a treasure trove of information about employment and unemployment. If you are wondering what the difference is between the CPS and EPS, read the following Clear it Up feature.

Clear It Up

What is the difference between CPS and EPS?

The United States Census Bureau conducts the Current Population Survey (CPS), which measures the percentage of the labor force that is unemployed. The Bureau of Labor Statistics' establishment payroll survey (EPS) is a payroll survey that 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 are discouraged by the lack of available jobs in their area and stopped looking? Such people, and their families, may be suffering the pains of unemployment. However, 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.

Link It Up

Click here to learn more about the CPS and to read frequently asked questions about employment and labor.

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10.3: Patterns of Unemployment

Learning Objectives

By the end of this section, you will be able to:

- Explain historical patterns of unemployment in the U.S.
- Identify trends of unemployment based on demographics
- Evaluate global unemployment rates

Let's look at how unemployment rates have changed over time and how various groups of people are affected by unemployment differently.

The Historical U.S. Unemployment Rate

Figure 8.3 shows the historical pattern of U.S. unemployment since 1955.

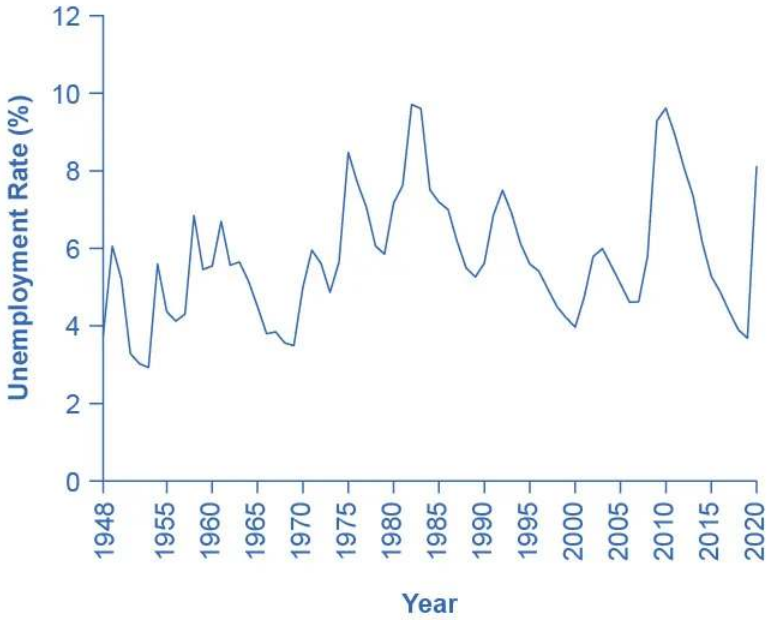


Figure 8.3 The U.S. Unemployment Rate, 1948–2020 The U.S. unemployment rate moves up and down as the economy moves in and out of recessions. However, over time, the unemployment rate seems to return to a range of 4% to 6%. There does not seem to be a long-term trend toward the rate moving generally higher or generally lower. (Source: Federal Reserve Economic Data (FRED) research.stlouisfed.org/fred...UN64TTUSA156S0)

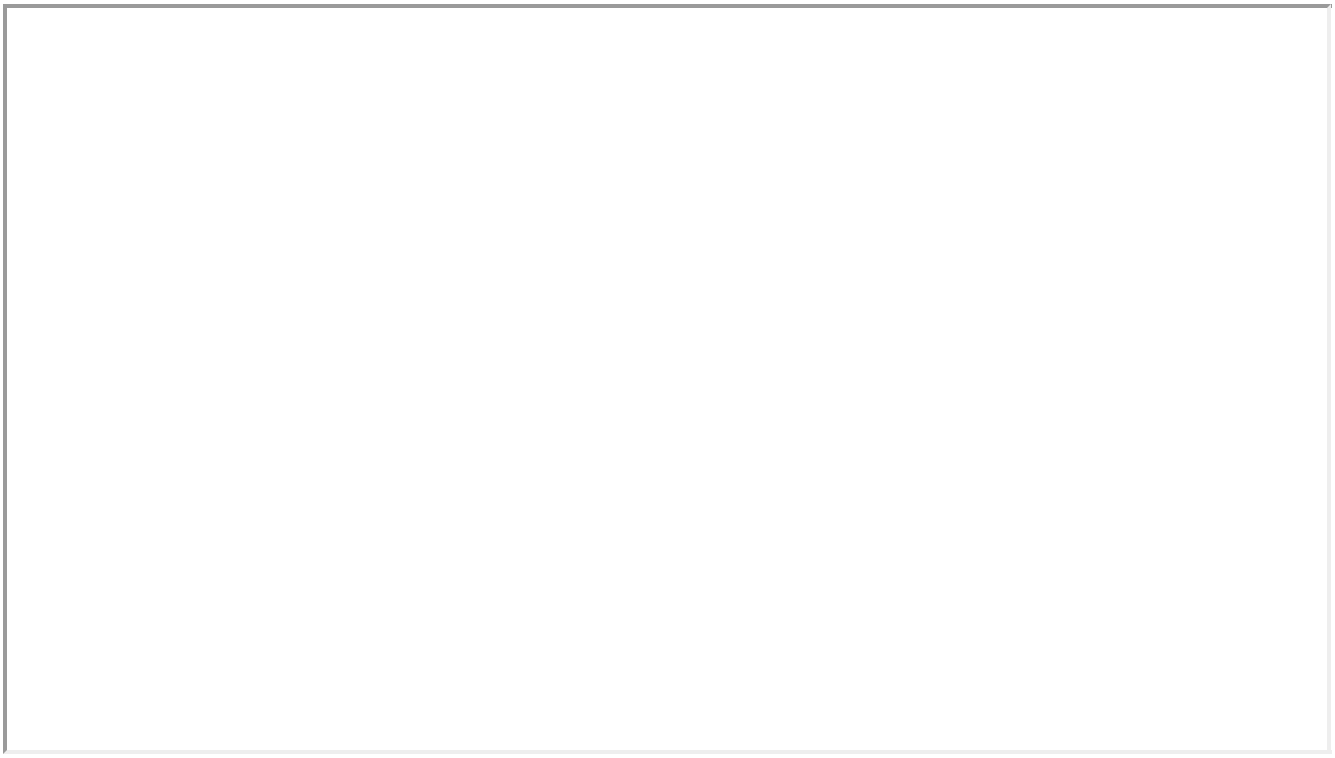
As we look at this data, several patterns stand out:

1. Unemployment rates do fluctuate over time. During the deep recessions of the early 1980s, 2007–2009, and 2021, unemployment reached roughly 10%. For comparison, during the 1930s Great Depression, 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, and 5% or less from September 2015 through March 2020. The previous time unemployment had been less than 5% for three consecutive years was three decades earlier, from 1968 to 1970.
3. The unemployment rate never falls all the way to zero. It almost never seems to get below 3%—and it stays that low only for very short periods. (We discuss reasons why this is the case later in this chapter.)
4. The timing of rises and falls in unemployment matches fairly well with the timing of upswings and downswings in the overall economy, except that unemployment tends to lag changes in economic activity, and especially so during upswings of the

economy following a recession. 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 more than quadrupled from 76 million in 1900 to over 324 million by 2017. 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 comprised 18% of the paid workforce in 1900 and nearly half of the paid workforce in 2021. However, 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.

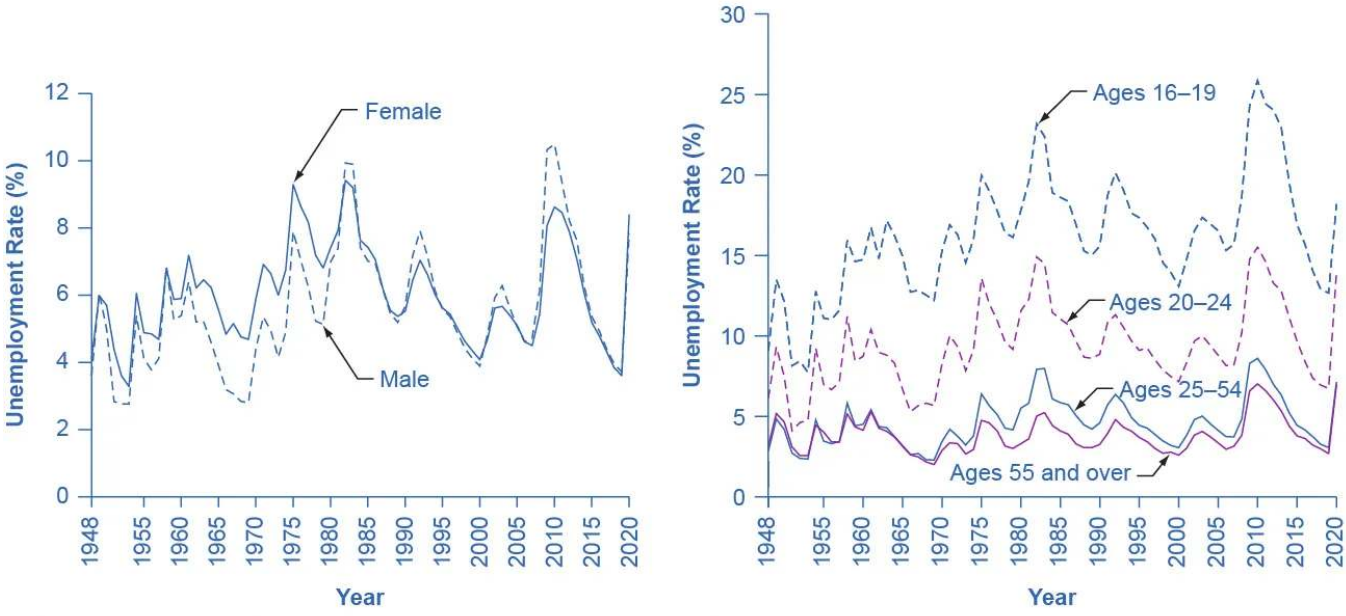
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Unemployment Rate from 1948. Similar to the graph in the figure above, the rate moves up and down as the economy moves in and out of recessions.

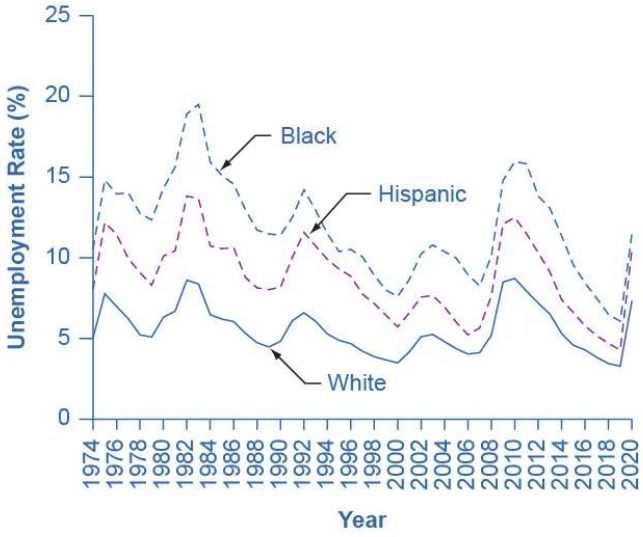
Unemployment Rates by Group

Unemployment is not distributed evenly across the U.S. population. Figure 8.4 shows unemployment rates broken down in various ways: by gender, age, and race/ethnicity.



(a) Unemployment rates by gender

(b) Unemployment rates for women, by age



(c) Unemployment rates by race and ethnicity

Figure 8.4 Unemployment Rate by Demographic Group (a) By gender, 1948–2020. 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– and especially during and soon after the Great Recession – with the unemployment rate for men somewhat higher. (b) By age, 1948–2020. Unemployment rates are highest for the very young and become lower with age. (c) By race and ethnicity, 1974–2020. Although unemployment rates for all groups tend to rise and fall together, the unemployment rate for Black people is typically about twice as high as that for White people, while the unemployment rate for Hispanic people is in between. (Source: www.bls.gov)

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 Figure 8.4 (a) shows. During the pandemic-induced recession of 2020 and in the immediate aftermath, the unemployment rate for women exceeded the unemployment rate for men. Subsequently, however, the gap has narrowed.

Link It Up

Read this report for detailed information on the 2008–2009 recession. 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. Younger workers move in and out of jobs more than middle-aged workers, as part of the process of matching of workers and jobs, and this contributes to their higher unemployment rates. In addition, middle-aged workers are more likely to feel the responsibility of needing to have a job more heavily. 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 8.4 (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 Black people's labor market opportunities. However, the gaps between unemployment rates for White, Black, and Hispanic people have diminished in the 1990s, as Figure 8.4 (c) shows. In fact, unemployment rates for Black and Hispanic people 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 November 2021, for example, the unemployment rate for those with a college degree was 2.3%; for those with some college but not a four year degree, the unemployment rate was 3.7%; for high school graduates with no additional degree, the unemployment rate was 5.2%; and for those without a high school diploma, the unemployment rate was 5.7%. This pattern arises because additional education typically offers better connections to the labor market and higher demand. With less attractive labor market opportunities for low-skilled workers compared to the opportunities for the more highly-skilled, including 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 unemployment, as well as the length of time individuals have been unemployed. Table 8.2, for example, shows the four reasons for unemployment and the percentages of the currently unemployed that fall into each category. Table 8.3 shows the length of unemployment. For both of these, the data is from November 2021.(bls.gov)

Reason	Percentage
New Entrants	6.5%
Re-entrants	31.8%
Job Leavers	12.5%
Job Losers: Temporary	11.8%
Job Losers: Non Temporary	37.3%

Table 8.2 Reasons for Unemployment, November 2021

Length of Time	Percentage
Under 5 weeks	22.3%
5 to 14 weeks	22.3%
15 to 26 weeks	17.6%
Over 27 weeks	37.7%

Table 8.3 Length of Unemployment, November 2021

Link It Up

Watch this speech on the impact of droids on the labor market.

International Unemployment Comparisons

From an international perspective, the U.S. unemployment rate typically has looked a little better than average. Table 8.4 compares unemployment rates for 1991, 1996, 2001, 2006 (just before the Great Recession), and 2019 (just before the pandemic-induced recession) from several other high-income countries.

Country	1991	1996	2001	2006	2019
United States	6.8%	5.4%	4.8%	4.4%	3.7%
Canada	9.8%	8.8%	6.4%	6.2%	5.7%
Japan	2.1%	3.4%	5.1%	4.5%	2.4%
France	9.5%	12.5%	8.7%	10.1%	8.5%
Germany	5.6%	9.0%	8.9%	9.8%	3.1%
Italy	6.9%	11.7%	9.6%	7.8%	10.0%
Sweden	3.1%	9.9%	5.0%	5.2%	7.0%
United Kingdom	8.8%	8.1%	5.1%	5.5%	3.9%

Table 8.4 International Comparisons of Unemployment Rates

However, we need to treat cross-country comparisons of unemployment rates with care, because each country has slightly different definitions of unemployment, 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. We can view this Japanese pattern as an unusual method for society to provide support for the unemployed, rather than a sign of a healthy economy.

Link It Up

We hear about the Chinese economy in the news all the time. The value of the Chinese yuan in comparison to the U.S. dollar is likely to be part of the nightly business report, so why is the Chinese economy not included in this discussion of international unemployment? The lack of reliable statistics is the reason. This article explains why.

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. However, 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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10.4: What Causes Changes in Unemployment over the Short Run

Learning Objectives

By the end of this section, you will be able to:

- Analyze cyclical unemployment
- Explain the relationship between sticky wages and employment using various economic arguments
- Apply supply and demand models to unemployment and wages

We have seen that unemployment varies across times and places. What causes changes in unemployment? There are different answers in the short run and in the long run. Let's look at the short run first.

Cyclical Unemployment

Let’s make the plausible assumption that in the short run, from a few months to a few years, the quantity of hours that the average person is willing to work for a given wage does not change much, so the labor supply curve does not shift much. In addition, make the standard *ceteris paribus* assumption that there is no substantial short-term change in the age structure of the labor force, institutions and laws affecting the labor market, or other possibly relevant factors.

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. 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. Economists call the variation in unemployment that the economy causes moving from expansion to recession or from recession to expansion (i.e. the business cycle) 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 Figure 8.5 illustrates, 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.

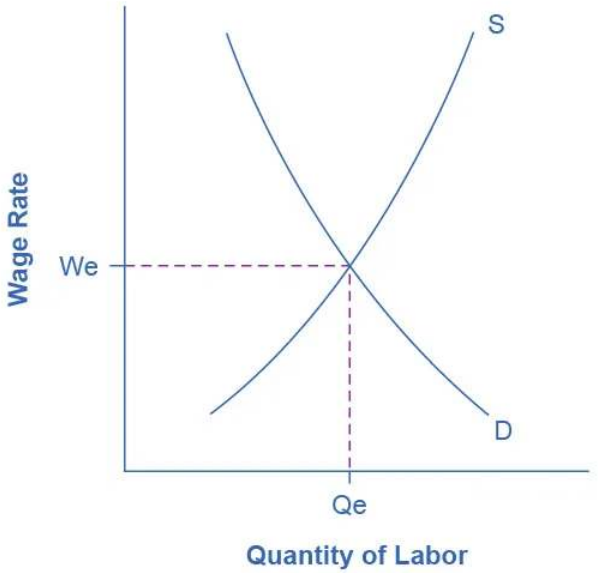


Figure 8.5 The Unemployment and Equilibrium in the Labor Market In a labor market with flexible wages, the equilibrium will occur at wage We and quantity Qe, where the number of people who want jobs (shown by S) equals the number of jobs available (shown by D).

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). However, from an economist's perspective, 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 those people are receiving. However, 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?

Why Wages Might Be Sticky Downward

If a labor market model with flexible wages does not describe unemployment very well—because it predicts that anyone willing to work at the going wage can always find a job—then it may prove useful to consider economic models in which wages are not flexible or adjust only very slowly. 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 receiving 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 73.3 million or so employed workers in the U.S. economy who earn wages by the hour, only about 1.1 million—less than 2% of the total—do not receive compensation above the minimum wage. Similarly, labor unions represent only about 12% of American wage and salary workers. 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. However, for the United States, these two factors combined affect only about 15% 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. Many have proposed a number of different theories, 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 workers' productivity 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 receive better pay 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 cuts argument 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 experiencing difficult times can persuade workers to take a pay cut for the short term, and still retain most of the firm's workers. However, 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 keep the organization running smoothly, to be

familiar with routine procedures, and to train new employees. However, cutting wages will alienate the insiders and damage the firm's productivity and prospects.

Finally, the relative wage coordination argument 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. Figure 8.6 illustrates this.

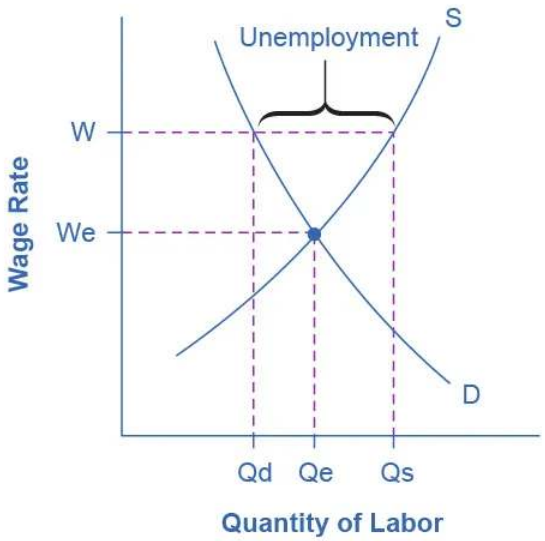


Figure 8.6 Sticky Wages in the Labor Market Because the wage rate is stuck at W, above the equilibrium, the number of those who want jobs (Qs) is greater than the number of job openings (Qd). The result is unemployment, shown by the bracket in the figure.

Figure 8.7 shows the interaction between shifts in labor demand and wages that are sticky downward. Figure 8.7 (a) illustrates the situation in which the demand for labor shifts to the right from D_0 to D_1. In this case, the equilibrium wage rises from W_0 to W_1 and the equilibrium quantity of labor hired increases from Q_0 to Q_1. It does not hurt employee morale at all for wages to rise.

Figure 8.7 (b) shows the situation in which 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. The gap represents the economic meaning of unemployment.

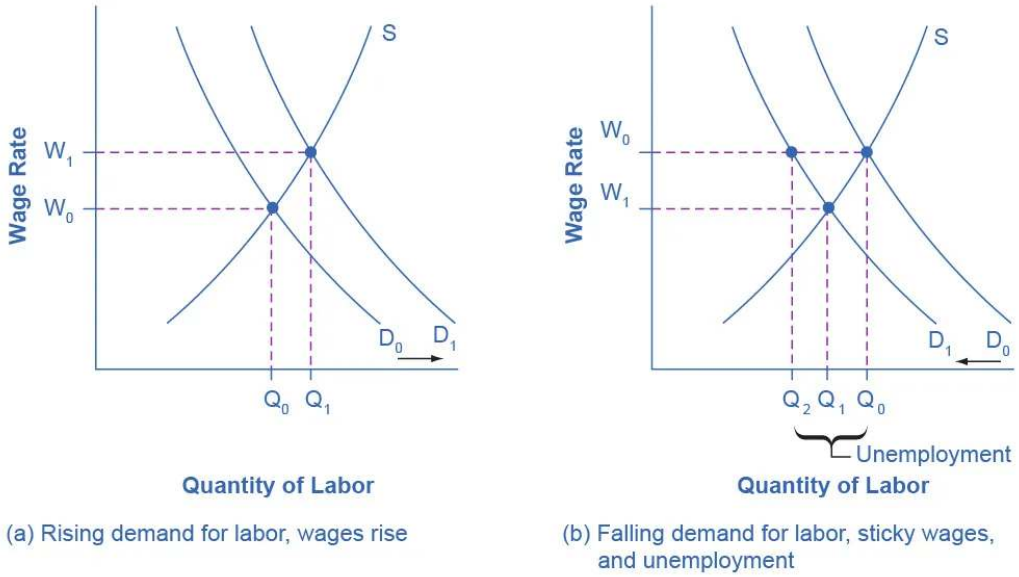


Figure 8.7 Rising Wage and Low Unemployment: Where Is the Unemployment in Supply and Demand? (a) In a labor market where wages are able to rise, an increase in the demand for labor from D_0 to D_1 leads to an increase in equilibrium quantity of labor hired from Q_0 to Q_1 and a rise in the equilibrium wage from W_0 to W_1. (b) 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.

This analysis helps to explain the connection that we noted earlier: that unemployment tends to rise in recessions and to decline during expansions. The overall state of the economy shifts the labor demand curve and, combined with wages that are sticky downwards, unemployment changes. The rise in unemployment that occurs because of a recession is cyclical unemployment.

Link It Up

The St. Louis Federal Reserve Bank is the best resource for macroeconomic time series data, known as the Federal Reserve Economic Data (FRED). FRED provides complete data sets on various measures of the unemployment rate as well as the monthly Bureau of Labor Statistics report on the results of the household and employment surveys.

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10.5: What Causes Changes in Unemployment over the Long Run

Learning Objectives

By the end of this section, you will be able to:

- Explain frictional and structural unemployment
- Assess relationships between the natural rate of employment and potential real GDP, productivity, and public policy
- Identify recent patterns in the natural rate of employment
- Propose ways to combat unemployment

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%. Moreover, the discussion earlier in this chapter 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: they call it the natural rate of unemployment.

The Long Run: 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. However, 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. Economists call the unemployment that occurs in the meantime, as workers move between jobs, 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 2008–2009 recession, it was true that about 7% of U.S. workers saw their jobs disappear in any three-month period. However, in periods of economic growth, these destroyed jobs are counterbalanced for the economy as a whole by a larger number of jobs created. In 2019, for example, there were typically about 6 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.

Of course, it would be preferable if people who were losing jobs could immediately and easily move into newly created jobs, 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. Figure 8.4 (b) showed that unemployment rates are typically lower for people between 25–54 years of age or aged 55 and over than they are for those who are younger. “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. In addition, older workers who lose jobs may prefer to opt for retirement. By contrast, it is likely that a relatively high proportion of those who are under 25 will be trying out jobs and life options, and this leads to greater job mobility and hence higher frictional unemployment. Thus, a society with a relatively high proportion of young workers, like the U.S. beginning in the mid-1960s when Baby Boomers began entering the labor market, will tend to have a higher unemployment rate than a society with a higher proportion of its workers in older ages.

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.

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.

Natural Unemployment and Potential Real GDP

The natural unemployment rate is related to two other important concepts: full employment and potential real GDP. Economists consider the economy to be at full employment when the actual unemployment rate is equal to the natural unemployment 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 all workers working overtime.

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, workers' productivity determines the level of wages in an economy. 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. Employers typically review wages 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, employers often determine wage increases 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 (as we discussed in Economic Growth). 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. Figure 8.8 (a) 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. However, 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. 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.

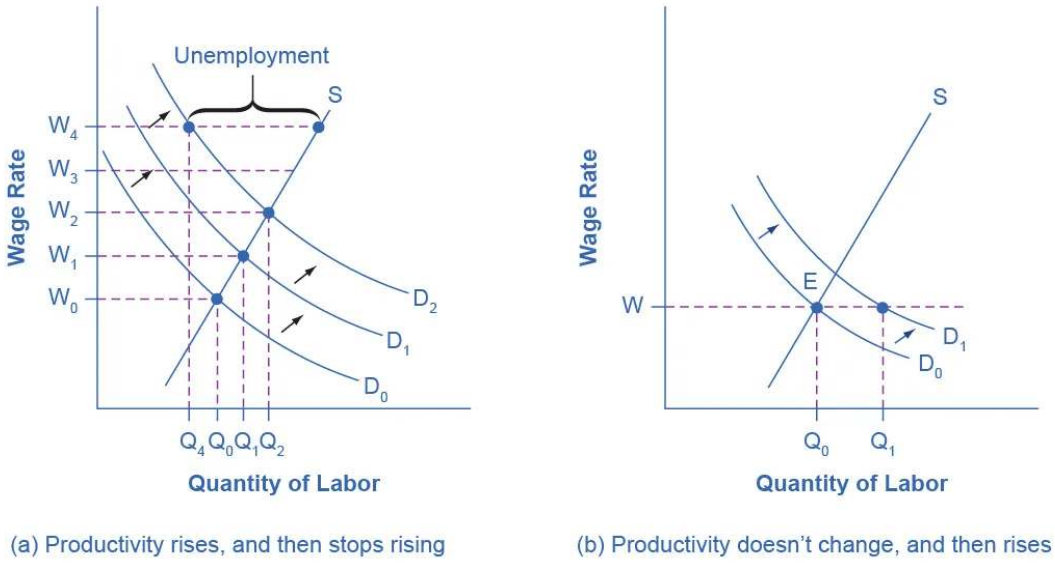


Figure 8.8 Unexpected Productivity Changes and Unemployment (a) Productivity is rising, increasing the demand for labor. Employers and workers become used to the pattern of wage increases. Then productivity suddenly stops increasing. However, the expectations of employers and workers for wage increases do not shift immediately, so wages keep rising as before. However, the demand for labor has not increased, so at wage W_4, unemployment exists where the quantity supplied of labor exceeds the quantity demanded. (b) The rate of productivity increase has been zero for a time, so employers and workers have come to accept the equilibrium wage level (W). Then productivity increases unexpectedly, shifting demand for labor from D_0 to D_1. At the wage (W), this means that the quantity demanded of labor exceeds the quantity supplied, and with job offers plentiful, the unemployment rate will be low.

The late 1990s provide an opposite example: instead of the surprise decline in productivity that occurred 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 Figure 8.8 (b), 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 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 (Qd) will for a time exceed the quantity of labor supplied (Qs), 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.

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. However, 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 unemployment 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. See the Clear it Up to learn how the U.S. handles unemployment insurance.

Clear It Up

How does U.S. unemployment insurance work?

Unemployment insurance is a joint federal–state program that the federal government enacted in 1935. While the federal government sets minimum standards for the program, state governments conduct most of the administration.

The funding for the program is a federal tax collected from employers. The federal government requires tax collection 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 they pay benefits, although most states limit unemployment benefits to 26 weeks—with extensions possible in times of especially high unemployment. The states then use the fund to pay benefits to those who become unemployed. Average unemployment benefits are equal to about one-third of the wage that the person earned in their 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	
Michigan	$362	Washington	$929
North Carolina	$350	Massachusetts	$823
South Carolina	$326	Minnesota	$740
Missouri	$320	New Jersey	$713
Florida	$275	Connecticut	$649
Tennessee	$275	Oregon	$648
Alabama	$275	Hawaii	$648
Louisiana	$275	North Dakota	$618
Arizona	$240	Colorado	$618
Mississippi	$235	Rhode Island	$586

Table 8.5 Maximum Weekly Unemployment Benefits by State in 2021 (Source: http://www.savingtoinvest.com/maximu...fits-by-state/)

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.

Link It Up

View this article for an explanation of exactly who is eligible for unemployment benefits.

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 a company can sell. Other government regulations, like zoning laws, may limit where companies can conduct business, 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—like the value some Christians place on not working on Sunday, or Orthodox Jews or highly observant Muslims on Saturday—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. We outline three of the common reasons that economists propose for this change 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, and requesting a list of jobs and application forms. 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 obtained 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 1964—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 we noted earlier, middle-aged and older workers are far more likely to experience low unemployment than younger workers, a factor that tends to reduce the natural rate of unemployment as the baby boomers age.

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 2008–2009 Great Recession pushed monthly unemployment rates up to 10% in late 2009. However, even at that time, the Congressional Budget Office was forecasting that by 2015, unemployment rates would fall back to about 5%. During the first two months of 2020, the unemployment rate held steady at 3.5%. As of the first quarter of 2022, the Congressional Budget Office estimates the natural rate to be 4.6%.

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 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.

Many European countries have a combination of generous welfare and unemployment benefits, together with nests of 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. However, when companies know that it will be difficult to fire or lay off workers, they also become hesitant about hiring in the first place.

We can attribute 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, 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

The Government Budgets and Fiscal Policy and Macroeconomic Policy Around the World chapters provide a detailed discussion of how to fight unemployment, when we can discuss these policies in the context of the full array of macroeconomic goals and frameworks for analysis. However, even at this preliminary stage, it is useful to preview 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. As Government Budgets and Fiscal Policy discusses, governments can enact this policy by stimulating the overall buying power 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. In a market-oriented economy, firms will hire and fire workers. Governments cannot control this. Furthermore, the evolving age structure of the economy's population, or unexpected shifts in productivity are beyond a government's control and, 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.

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 find one another. For example, the government may have a role to play in helping some of the unemployed with job searches. Governments may need to rethink the design of their programs that offer assistance to unemployed workers and protections to employed workers so that they will not unduly discourage the supply of labor. Similarly, governments may need to reassess rules that make it difficult for businesses to begin or to expand so that they will not unduly discourage the demand for labor. The message is not that governments should repeal all laws affecting labor markets, but only that when they enact such laws, a society that cares about unemployment will need to consider the tradeoffs involved.

Bring It Home

Unemployment and the COVID-19 Pandemic

Almost two years after the pandemic began, the unemployment rate was on track to go below 4% again by early- to mid-2022. While this is great news for workers, we have also seen that the story of the labor market is more complicated than a single statistic might suggest. Millions remained out of the labor force due to the public health situation, and the percentage of workers unemployed for longer than 26 weeks was still high.

The shift to remote work helped the unemployment rate come down by providing greater flexibility for workers concerned with their health and safety. But it didn't help workers, especially women, who continued to be burdened with excessive care responsibilities at home. During 2020, the unemployment rate for women exceeded that of men by over a full percentage point. Additionally, virus variants in other countries threatened to disrupt progress made at home and abroad.

The pandemic has helped shed light on how we can use information from all areas of the labor market to evaluate the health of the economy.

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10.6: Key Terms

adverse selection of wage cuts argument
if employers reduce wages for all workers, the best will leave

cyclical unemployment
unemployment closely tied to the business cycle, like higher unemployment during a recession

discouraged workers
those who have stopped looking for employment due to the lack of suitable positions available

efficiency wage theory
the theory that the productivity of workers, either individually or as a group, will increase if the employer pays them more

frictional unemployment
unemployment that occurs as workers move between jobs

implicit contract
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

insider-outsider model
those already working for the firm are “insiders” who know the procedures; the other workers are “outsiders” who are recent or prospective hires

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

natural rate of unemployment
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

out of the labor force
those who are not working and not looking for work—whether they want employment or not; also termed “not in the labor force”

relative wage coordination argument
across-the-board wage cuts are hard for an economy to implement, and workers fight against them

structural unemployment
unemployment that occurs because individuals lack skills valued by employers

underemployed
individuals who are employed in a job that is below their skills

unemployment rate
the percentage of adults who are in the labor force and thus seeking jobs, but who do not have jobs

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10.7: Key Concepts and Summary

8.1 How Economists Define and Compute Unemployment Rate

Unemployment imposes high costs. Unemployed individuals experience loss of income and stress. An economy with high unemployment suffers an opportunity cost of unused resources. We can divide the adult population into those in the labor force and those out of the labor force. In turn, we divide those in the labor force into employed and unemployed. A person without a job must be willing and able to work and actively looking for work to be counted as unemployed; otherwise, a person without a job is counted as out of the labor force. Economists define the unemployment rate as the number of unemployed persons divided by the number of persons in the labor force (not the overall adult population). The Current Population Survey (CPS) conducted by the United States Census Bureau measures the percentage of the labor force that is unemployed. The establishment payroll survey by the Bureau of Labor Statistics measures the net change in jobs created for the month.

8.2 Patterns of Unemployment

The U.S. unemployment rate rises during periods of recession and depression, but falls back to the range of 4% to 6% when the economy is strong. The unemployment rate never falls to zero. Despite enormous growth in the size of the U.S. population and labor force in the twentieth century, along with other major trends like globalization and new technology, the unemployment rate shows no long-term rising trend.

Unemployment rates differ by group: higher for African-Americans and Hispanic people than for White people; higher for less educated than more educated; higher for the young than the middle-aged. Women's unemployment rates used to be higher than men's, but in recent years men's and women's unemployment rates have been very similar. In recent years, unemployment rates in the United States have compared favorably with unemployment rates in most other high-income economies.

8.3 What Causes Changes in Unemployment over the Short Run

Cyclical unemployment rises and falls with the business cycle. In a labor market with flexible wages, wages will adjust in such a market so that quantity demanded of labor always equals the quantity supplied of labor at the equilibrium wage. Economists have proposed many theories for why wages might not be flexible, but instead may adjust only in a "sticky" way, especially when it comes to downward adjustments: implicit contracts, efficiency wage theory, adverse selection of wage cuts, insider-outsider model, and relative wage coordination.

8.4 What Causes Changes in Unemployment over the Long Run

The natural rate of unemployment is the rate of unemployment that the economic, social, and political forces in the economy would cause even when the economy is not in a recession. These factors include the frictional unemployment that occurs when people either choose to change jobs or are put out of work for a time by the shifts of a dynamic and changing economy. They also include any laws concerning conditions of hiring and firing that have the undesired side effect of discouraging job formation. They also include structural unemployment, which occurs when demand shifts permanently away from a certain type of job skill.

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CHAPTER OVERVIEW

11: Money and Banking

11.1: Introduction to Money and Banking
11.2: Defining Money by Its Functions
11.3: Measuring Money- Currency, M1, and M2
11.4: The Role of Banks
11.5: How Banks Create Money
11.6: Key Terms
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11.1: Introduction to Money and Banking



Figure 14.1 Cowrie Shell or Money? Is this an image of a cowrie shell or money? The answer is: Both. For centuries, people used the extremely durable cowrie shell as a medium of exchange in various parts of the world. (Credit: modification of "Cowry Shell (Cypraeidae)" by Silke Baron/Flickr Creative Commons, CC BY 2.0)

Chapter Objectives

In this chapter, you will learn about:

- Defining Money by Its Functions
- Measuring Money: Currency, M1, and M2
- The Role of Banks
- How Banks Create Money

Bring It Home

The Many Disguises of Money: From Cowries to Crypto

Here is a trivia question: In the history of the world, what item did people use 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 the means for exchange in markets including southern Europe, western Africa, India, and China: 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 they would exchange. Third, it was impossible to counterfeit a cowrie shell, but dishonest people could counterfeit gold or silver coins by making copies with cheaper metals. Finally, in the heyday of cowrie money, from the 1500s into the 1800s, governments, first the Portuguese, then the Dutch and English, tightly controlled collecting cowries. As a result, the supply of cowries grew 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 with the advent of cryptocurrency. What do you think money is?

The discussion of money and banking is a central component in studying macroeconomics. At this point, you should have firmly in mind the main goals of macroeconomics from Welcome to Economics!: economic growth, low unemployment, and low inflation. We have yet to discuss money and its role in helping to achieve our macroeconomic goals.

You should also understand Keynesian and neoclassical frameworks for macroeconomic analysis and how we can embody these frameworks in the aggregate demand/aggregate supply (AD/AS) model. With the goals and frameworks for macroeconomic analysis in mind, the final step is to discuss the two main categories of macroeconomic policy: monetary policy, which focuses on money, banking and interest rates; and fiscal policy, which focuses on government spending, taxes, and borrowing. This chapter discusses what economists mean by money, and how money is closely interrelated with the banking system. Monetary Policy and Bank Regulation furthers this discussion.

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11.2: Defining Money by Its Functions

Learning Objectives

By the end of this section, you will be able to:

- Explain the various functions of money
- Contrast commodity money and fiat money

Money for the sake of money is not an end in itself. You cannot eat dollar bills or wear your bank account. Ultimately, the usefulness of money rests in exchanging it for goods or 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, and thus both buyers and sellers must widely accept money. This concept of money is intentionally flexible, because money has taken a wide variety of forms in different cultures.

Barter and the Double Coincidence of Wants

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 engage in the barter system. Barter—literally trading one good or service for another—is highly inefficient for trying to coordinate the trades in a modern advanced economy. In an economy without money, an exchange between two people would involve a double coincidence of wants, a situation in which two people each want some good or service that the other person can provide. For example, if an accountant wants a pair of shoes, this accountant must find someone who has a pair of shoes in the correct size and who is willing to exchange the shoes for some hours of accounting services. Such a trade is likely to be difficult to arrange. Think about the complexity of such trades in a modern economy, with its extensive division of labor that involves thousands upon thousands of different jobs and goods.

Another problem with the barter system is that it does not allow us to easily enter into future contracts for purchasing many goods and services. For example, if the goods are perishable it may be difficult to exchange them for other goods in the future. Imagine a farmer wanting to buy a tractor in six months using a fresh crop of strawberries. Additionally, while the barter system might work adequately in small economies, it will keep these economies from growing. The time that individuals would otherwise spend producing goods and services and enjoying leisure time they spend bartering.

Functions for Money

Money solves the problems that the barter system creates. (We will get to its definition soon.) First, money serves as a medium of exchange, which means that money acts as an intermediary between the buyer and the seller. Instead of exchanging accounting services for shoes, the accountant now exchanges accounting services for money. The accountant then uses this money to buy shoes. To serve as a medium of exchange, people must widely accept money as a method of payment in the markets for goods, labor, and financial capital.

Second, money must serve as a store of value. In a barter system, we saw the example of the shoemaker trading shoes for accounting services. However, she risks having her shoes go out of style, especially if she keeps them in a warehouse for future use—their value will decrease with each season. Shoes are not a good store of value. Holding money is a much easier way of storing value. You know that you do not need to spend it immediately because it will still hold its value the next day, or the next year. This function of money does not require that money is a *perfect* store of value. 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 we measure values. For example, an accountant may charge $100 to file your tax return. That $100 can purchase two pair of shoes at $50 a pair. Money acts as a common denominator, an accounting method that simplifies thinking about trade-offs.

Finally, another 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 to make purchases today that the purchaser will pay 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. Thus, money serves all of these functions— it is a medium of exchange, store of value, unit of account, and standard of deferred payment.

Commodity versus Fiat Money

Money has taken a wide variety of forms in different cultures. People have used gold, silver, cowrie shells, cigarettes, and even cocoa beans as money. Although we use these items as commodity money, they also have a value from use as something other than money. For example, people have used gold throughout the ages as money although today we do not use it as money but rather value it for its other attributes. Gold is a good conductor of electricity and the electronics and aerospace industry use it. Other industries use gold too, such as to manufacture energy efficient reflective glass for skyscrapers and is used in the medical industry as well. Of course, gold also has value because of its beauty and malleability in creating jewelry.

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 other commodities held at a bank. During much of its history, gold and silver backed the money supply in the United States. Interestingly, antique dollars dated as late as 1957, have “Silver Certificate” printed over the portrait of George Washington, as Figure 14.2 shows. This meant that the holder could take the bill to the appropriate bank and exchange it for a dollar’s worth of silver.



Figure 14.2 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 on the bill. Today, The Federal Reserve backs U.S. bills, but as fiat money (inconvertible paper money made legal tender by a government decree). (Credit: "One Dollar Bills" by “The.Comedian”/Flickr Creative Commons, CC BY 2.0)

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 a country's legal tender. 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.

Link It Up

Watch this video on the “History of Money.”

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11.3: Measuring Money- Currency, M1, and M2

Learning Objectives

By the end of this section, you will be able to:

- Contrast M1 money supply and M2 money supply
- Classify monies as M1 money supply or M2 money supply

Cash in your pocket certainly serves as money; however, 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 liquidity. Liquidity refers to how quickly you can use a financial asset to buy a good or service. For example, cash is very liquid. You can use your $10 bill easily 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.

The Federal Reserve Bank, which is the central bank of the United States, is a bank regulator and is responsible for monetary policy and defines money according to its liquidity. There are two definitions of money: M1 and M2 money supply. Historically, M1 money supply included those monies that are very liquid such as cash, checkable (demand) deposits, and traveler's checks, while M2 money supply included those monies that are less liquid in nature; M2 included M1 plus savings and time deposits, certificates of deposits, and money market funds. Beginning in May 2020, the Federal Reserve changed the definition of both M1 and M2. The biggest change is that savings moved to be part of M1. M1 money supply now includes cash, checkable (demand) deposits, and savings. M2 money supply is now measured as M1 plus time deposits, certificates of deposits, and money market funds.

M1 money supply includes coins and currency in circulation—the coins and bills that circulate in an economy that the U.S. Treasury does not hold at the Federal Reserve Bank, or in bank vaults. 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 the customer writes a check or uses a debit card. These items together—currency, and checking accounts in banks—comprise the definition of money known as M1, which the Federal Reserve System measures daily.

As mentioned, M1 now 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.

A broader definition of money, M2 includes everything in M1 but also adds other types of deposits. Many banks and other financial institutions also offer a chance to invest in money market funds, where they pool together the deposits of many individual investors and invest them in a safe way, such as short-term government bonds. Another ingredient of M2 are the relatively small (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 14.3 should help in visualizing the relationship between M1 and M2. Note that M1 is included in the M2 calculation.



Figure 14.3 The Relationship between M1 and M2 Money M1 and M2 money have several definitions, ranging from narrow to broad. M1 = coins and currency in circulation + checkable (demand) deposit + savings deposits. M2 = M1 + 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. To provide an idea of what these amounts sound like, according to the Federal Reserve Bank's measure of the U.S. money stock, at the end of November 2021, M1 in the United States was $20.3 trillion, while M2 was $21.4 trillion. Table 14.1 provides a breakdown of the portion of each type of money that comprised M1 and M2 in November 2021, as provided by the Federal Reserve Bank.

Components of M1 in the U.S. (November 2021, Seasonally Adjusted)	**$ billions**
Currency	$2,114.6
Demand deposits	$4,764.1
Savings and other liquid deposits	$13,466.3
Total M1	*$20,345 (or $21.4 trillion)*
Components of M2 in the U.S. (November 2021, Seasonally Adjusted)	**$ billions**
M1 money supply	$19,221
Small-denomination time deposits	$120
Retail money market fund balances	$1,027
Total M2	*$20,368 (or $20 trillion)*

Table 14.1 M1 and M2 Federal Reserve Statistical Release, Money Stock Measures (Source: Federal Reserve Statistical Release, http://www.federalreserve.gov/RELEAS....htm#t2tg1link)

The lines separating M1 and M2 can become a little blurry. Sometimes businesses do not treat elements of M1 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.

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. 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, the financial institution does not consider it money but rather a short term loan from the credit card company to you. When you make a credit card purchase, 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 you can only use them for certain purchases or in certain places.

In short, credit cards, debit cards, and smart cards are different ways to move money when you make a purchase. However, having more credit cards or debit cards does not change the quantity of money in the economy, any more than printing more checks 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. The banking system largely conducts macroeconomic policies concerning money. The next section explains how banks function and how a nation's banking system has the power to create money.

Link It Up

Read a brief article on the monetary challenges in Sweden.

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11.4: The Role of Banks

Learning Objectives

By the end of this section, you will be able to:

- Explain how banks act as intermediaries between savers and borrowers
- Evaluate the relationship between banks, savings and loans, and credit unions
- Analyze the causes of bankruptcy and recessions

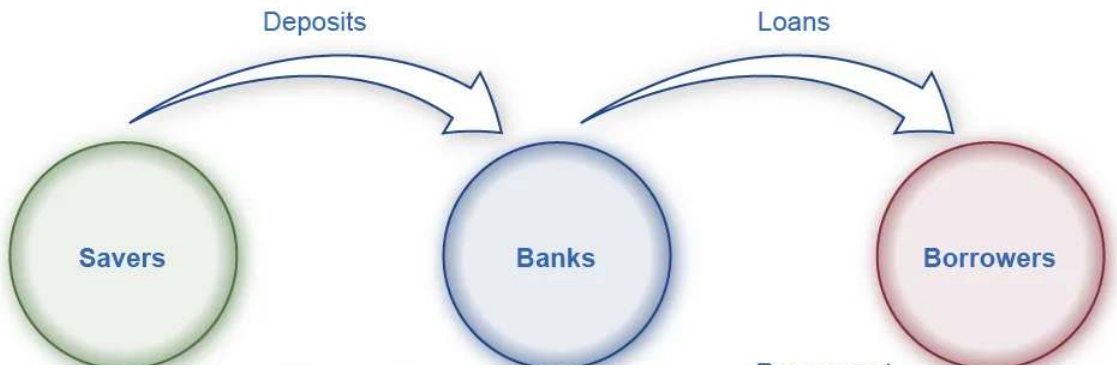
Somebody once asked the late bank robber named Willie Sutton why he robbed banks. He answered: “That’s where the money is.” While this may have been true at one time, from the perspective of modern economists, Sutton is both right and wrong. He is wrong because the overwhelming majority of money in the 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 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 everybody had to make all payments 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 direct withdrawal, writing a check, or using a debit card.

Banks are a critical intermediary in what we call the payment system, which helps an economy exchange goods and services for money or other financial assets. Also, those with extra money that they would like to save can store their money in a bank rather than look for an individual who is willing to borrow it from them and then repay them at a later date. Those who want to borrow money can go directly to a bank rather than trying to find someone to lend them cash. 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 creating money.

Banks as Financial Intermediaries

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. Financial intermediaries include other institutions in the financial market such as insurance companies and pension funds, but we will not include them in this discussion because they are not depository institutions, which are institutions that accept money *deposits* and then use these to make loans. All the deposited funds mingle in one big pool, which the financial institution then lends. Figure 14.4 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.



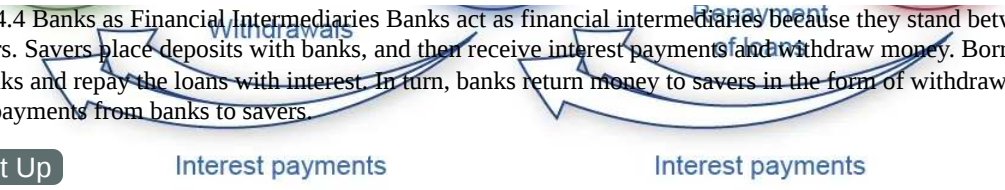


Figure 14.4 Banks as Financial Intermediaries Banks act as financial intermediaries because they stand between savers and borrowers. Savers place deposits with banks, and then receive interest payments and withdraw money. Borrowers receive loans from banks and repay the loans with interest. In turn, banks return money to savers in the form of withdrawals, which also include interest payments from banks to savers.

Clear It Up

How are banks, savings and loans, and credit unions related?

Banks have a couple of close cousins: savings institutions and credit unions. Banks, as we explained, receive deposits from individuals and businesses and make loans with the money. Savings institutions are also sometimes called "savings and loans" 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.

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. By 2020, there were 4,374 commercial banks and 627 savings institutions. According to the National Credit Union Association, as of September 2021 there were 4,990 credit unions with assets totaling $2.0 trillion. 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. Consequently, some now hold assets with a total value as large as $111 billion.

A Bank's Balance Sheet

A balance sheet is an accounting tool that lists assets and liabilities. An asset is something of value that you own and you can use to produce something. For example, you can use the cash you own to pay your tuition. If you own a home, this is also an asset. A liability is a debt or something you owe. Many people borrow money to buy homes. In this case, a home is the asset, but the mortgage 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 as bank capital. We also refer to a bank has assets such as cash held in its vaults, monies that the bank holds at the Federal Reserve bank (called "reserves"), loans that it makes to customers, and bonds.

Figure 14.5 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," we sometimes call it 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 14.5 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 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, when the customers wish to withdraw their money. In the example in Figure 14.5, the Safe and Secure Bank holds $10 million in deposits.

Loans are the first category of bank assets in Figure 14.5. 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. However, in practical terms, how can we measure the value of the mortgage loan that the borrower is paying over 30 years 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. We call the market where financial institutions make loans to borrowers the primary loan market, while the market in which financial institutions buy and sell these loans 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 borrower's characteristics, such as income level and whether the local economy is performing strongly, what proportion of loans of this type will the borrower repay? The greater the risk that a borrower will not repay loan, the less that any financial institution will pay to acquire the loan. Another key factor is to compare the interest rate the financial institution charged on the original loan with the current interest rate in the economy. If the original loan 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 sold them to other financial institutions in the secondary market is $5 million.

The second category of bank asset is bonds, which are a common mechanism for borrowing, used by the federal and local government, and also private companies, and nonprofit organizations. A bank takes some of the money it has received in deposits and uses the money to buy bonds—typically bonds issued that the U.S. government issues. 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 it does not lend or invest 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 their vaults or at the Federal Reserve Bank. We call this a reserve requirement. (Monetary Policy and Bank Regulation will explain how the level of these required reserves are 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.

We define net worth of a bank as its total assets minus its total liabilities. For the Safe and Secure Bank in Figure 14.5, 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.

Link It Up

For some concrete examples of what banks do, watch this video from Paul Solman's "Making Sense of Financial News."

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 banks' expenses every year include a factor for loans that borrowers do not repay, and the value of a bank's loans on its balance sheet assumes a certain level of riskiness because some customers will not repay loans. 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 14.5 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 negative net worth.

Clear It Up

What led to the 2008–2009 financial crisis?

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 "securitized," which means that they are bundled together into a financial security that a financial institution sells 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. However, 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 exposure 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 significant 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 pool it into a financial security.

However, securitization also offers one potentially large disadvantage. If a bank plans to hold a mortgage loan as an asset, the bank has an incentive to scrutinize the borrower carefully to ensure that the customer is likely to repay the loan. However, a bank that plans 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 we call "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. Economists dubbed some of the subprime loans made by financial institutions in the mid-2000s NINJA loans: loans that financial institutions made even though the borrower had demonstrated No Income, No Job, or Assets.

Financial institutions typically sold these subprime loans and turned them 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. However, 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 be worth much less than they had expected—and so the banks were faced with staring bankruptcy. In the 2008–2011 period, 318 banks failed in the United States.

The risk of an unexpectedly high level of loan defaults can be especially difficult for banks because a bank's liabilities, namely it customers' deposits. Customers can withdraw funds 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—the ability for customers to withdraw bank's liabilities in the short term while customers repay its assets 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 it 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 we 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 customers will not repay a higher share of loans in tough economic times.

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11.5: How Banks Create Money

Learning Objectives

By the end of this section, you will be able to:

- Utilize the money multiplier formulate to determine how banks create money
- Analyze and create T-account balance sheets
- Evaluate the risks and benefits of money and banks

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.

Money Creation by a Single Bank

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 in Figure 14.6. At this stage, Singleton Bank is simply storing money for depositors and is using these deposits to make loans. In this simplified example, Singleton Bank cannot earn any interest income from these loans and cannot pay its depositors an interest rate either.

Assets		Liabilities + Net Worth	
Reserves	$10 million	Deposits	$10 million

Figure 14.6 Singleton Bank's Balance Sheet: Receives $10 million in Deposits

The Federal Reserve requires Singleton Bank to keep $1 million on reserve (10% of total deposits). 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 (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 Figure 14.7 shows. 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 14.7 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 it has made a loan. This loan is an asset, because it will generate interest income for the bank. Of course, the loan officer will not allow let Hank to 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 14.8 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 14.8 First National Balance Sheet

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 one can easily use 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 as Hank's Auto Supply writes checks to pay its bills the deposits will draw down. However, the bigger picture is that a

bank must hold enough money in reserves to meet its liabilities. The rest the bank loans out. 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 ($900,000) but can lend out the other 90% ($8.1 million) in a loan to Jack's Chevy Dealership as Figure 14.9 shows.

Assets		Liabilities + Net Worth	
Reserves	$900,000	Deposits	+ $9 million
Loans	$8.1 million		

Figure 14.9 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 14.10 shows.

Assets		Liabilities + Net Worth	
Reserves	+ $8.1 million	Deposits	+ $8.1 million

Figure 14.10 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.

Link It Up

Watch this video to learn more about how banks create money.

The Money Multiplier and a Multi-Bank System

In a system with multiple banks, Singleton Bank deposited the initial excess reserve amount that it decided to lend to Hank's Auto Supply 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, institutions determine the amount of money that the system can create by using the money multiplier. This tells us by how many times a loan will be "multiplied" as it is spent in the economy and then re-deposited in other banks.

Fortunately, a formula exists for calculating the total of these many rounds of lending in a banking system. The money multiplier formula is:

Work It Out

Using the Money Multiplier Formula

Using the money multiplier for the example in this text:

Step 1. In the case of Singleton Bank, for whom the reserve requirement is 10% (or 0.10), the money multiplier is 1 divided by .10, which is equal to 10.

Step 2. We have identified that the excess reserves are $9 million, so, using the formula we can determine the total change in the M1 money supply:

Total Change in the M1 Money Supply=1Reserve Requirement × Excess Requirement=10.10 × $9 million=10 × $9 million=$90 millionTotal Change in the M1 Money Supply=1Reserve Requirement × Excess Requirement=10.10 × $9 million=10 × $9 million=$90 million

Step 3. Thus, we can say that, in this example, the total quantity of money generated in this economy after all rounds of lending are completed will be $90 million.

Cautions about the Money Multiplier

The money multiplier will depend on the proportion of reserves that the Federal Reserve Band requires banks to hold. 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 customers are less likely to repay loans 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 Monetary Policy and Bank Regulation will discuss.

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. All the money in the economy, except for the original reserves, is a result of bank loans that institutions repeatedly re-deposit and loan.

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. 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.

Link It Up

Watch a video of Jem Bendell discussing “The Money Myth.”

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.

Bring It Home

The Many Disguises of Money: From Cowries to Crypto

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 a new form of money is cryptocurrency. Cryptocurrency is digital currency that is not controlled by any single entity, such as a company or country. In this sense, it is not a fiat currency because it is not issued by a central bank and is not necessarily supported by governments as legal tender. Instead, transactions and ownership are maintained in a decentralized manner, and the value (vis-à-vis, say, the U.S. dollar) is determined primarily by market forces—i.e., supply and demand. Governments can affect the value of a cryptocurrency by regulating its use within their country's boundaries, but in the end, the price of a cryptocurrency comes down to supply and demand. Cryptocurrencies have come a long way since 2009 when Bitcoin was first invented, and the recent two to three years has seen an explosion of different cryptocurrencies being used across the globe.

It is important to note that in order to be considered as money, cryptocurrency still needs to satisfy the three requirements: it needs to be valid as a store of value, it needs to be valid as a unit of account, and it must be able to be used as a medium of exchange. While the first two of these requirements can be satisfied easily by expressing the currency in terms of another, such as the U.S. dollar, and through its secure ownership rules, its use as a medium of exchange—to be used to buy and sell goods and services—is more complicated. While cryptocurrencies are used in many illicit transactions, it is less common to see them accepted as forms of payment for regular things like groceries or your rent.

Bitcoin is the most popular cryptocurrency, and thus the one most likely to be considered real money since it can be used to purchase the most goods and services. Other popular cryptocurrencies as of early 2022 (in terms of trade volume) are Ethereum and Binance Coin. Many other cryptocurrencies exist, but their more widespread adoption as a medium of exchange is yet to be seen.

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11.6: Key Terms

asset
item of value that a firm or an individual owns

asset–liability time mismatch
customers can withdraw a bank's liabilities in the short term while customers repay its assets in the long term

balance sheet
an accounting tool that lists assets and liabilities

bank capital
a bank's net worth

barter
literally, trading one good or service for another, without using money

coins and currency in circulation
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

commodity money
an item that is used as money, but which also has value from its use as something other than money

commodity-backed currencies
dollar bills or other currencies with values backed up by gold or another commodity

credit card
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

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

demand deposit
checkable deposit in banks that is available by making a cash withdrawal or writing a check

depository institution
institution that accepts money deposits and then uses these to make loans

diversify
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

double coincidence of wants
a situation in which two people each want some good or service that the other person can provide

fiat money
has no intrinsic value, but is declared by a government to be the country's legal tender

financial intermediary
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

liability

any amount or debt that a firm or an individual owes

M1 money supply

a narrow definition of the money supply that includes currency and checking accounts in banks, and to a lesser degree, traveler's checks.

M2 money supply

a definition of the money supply that includes everything in M1, but also adds savings deposits, money market funds, and certificates of deposit

medium of exchange

whatever is widely accepted as a method of payment

money

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.

money market fund

the deposits of many investors are pooled together and invested in a safe way like short-term government bonds

money multiplier formula

total money in the economy divided by the original quantity of money, or change in the total money in the economy divided by a change in the original quantity of money

net worth

the excess of the asset value over and above the amount of the liability; total assets minus total liabilities

payment system

helps an economy exchange goods and services for money or other financial assets

reserves

funds that a bank keeps on hand and that it does not loan out or invest in bonds

savings deposit

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

smart card

stores a certain value of money on a card and then one can use the card to make purchases

standard of deferred payment

money must also be acceptable to make purchases today that will be paid in the future

store of value

something that serves as a way of preserving economic value that one can spend or consume in the future

T-account

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"

time deposit

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

transaction costs

the costs associated with finding a lender or a borrower for money

unit of account

the common way in which we measure market values in an economy

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11.7: Key Concepts and Summary

14.1 Defining Money by Its Functions

Money is what people in a society regularly use when purchasing or selling goods and services. If money were not available, people would need to barter with each other, meaning that each person would need to identify others with whom they have a double coincidence of wants—that is, each party has a specific good or service that the other desires. Money serves several functions: a medium of exchange, a unit of account, a store of value, and a standard of deferred payment. There are two types of money: commodity money, which is an item used as money, but which also has value from its use as something other than money; and fiat money, which has no intrinsic value, but is declared by a government to be the country's legal tender.

14.2 Measuring Money: Currency, M1, and M2

We measure money with several definitions: M1 includes currency and money in checking accounts (demand deposits). Traveler’s checks are also a component of M1, but are declining in use. M2 includes all of M1, plus savings deposits, time deposits like certificates of deposit, and money market funds.

14.3 The Role of Banks

Banks facilitate using money for transactions in the economy because people and firms can use bank accounts when selling or buying goods and services, when paying a worker or receiving payment, and when saving money or receiving a loan. In the financial capital market, banks are financial intermediaries; that is, they operate between savers who supply financial capital and borrowers who demand loans. A balance sheet (sometimes called a T-account) is an accounting tool which lists assets in one column and liabilities in another. The bank's liabilities are its deposits. The bank's assets include its loans, its ownership of bonds, and its reserves (which it does not loan out). We calculate a bank's net worth by subtracting its liabilities from its assets. Banks run a risk of negative net worth if the value of their assets declines. The value of assets can decline because of an unexpectedly high number of defaults on loans, or if interest rates rise and the bank suffers an asset-liability time mismatch in which the bank is receiving a low interest rate on its long-term loans but must pay the currently higher market interest rate to attract depositors. Banks can protect themselves against these risks by choosing to diversify their loans or to hold a greater proportion of their assets in bonds and reserves. If banks hold only a fraction of their deposits as reserves, then the process of banks’ lending money, re-depositing those loans in banks, and the banks making additional loans will create money in the economy.

14.4 How Banks Create Money

We define the money multiplier as the quantity of money that the banking system can generate from each $1 of bank reserves. The formula for calculating the multiplier is 1/reserve ratio, where the reserve ratio is the fraction of deposits that the bank wishes to hold as reserves. The quantity of money in an economy and the quantity of credit for loans are inextricably intertwined. The network of banks making loans, people making deposits, and banks making more loans creates much of the money in an economy.

Given the macroeconomic dangers of a malfunctioning banking system, Monetary Policy and Bank Regulation will discuss government policies for controlling the money supply and for keeping the banking system safe.

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CHAPTER OVERVIEW

12: Monetary Policy and Bank Regulation

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12.2: The Federal Reserve Banking System and Central Banks
12.3: Bank Regulation
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12.1: Introduction to Monetary Policy and Bank Regulation



Figure 15.1 Marriner S. Eccles Federal Reserve Headquarters, Washington D.C. Some of the most influential decisions regarding monetary policy in the United States are made behind these doors. (Credit: modification of work by "Marriner S. Eccles Federal Reserve" by LunchboxLarry/Flickr Creative Commons, CC BY 2.0)

Chapter Objectives

In this chapter, you will learn about:

- The Federal Reserve Banking System and Central Banks
- Bank Regulation
- How a Central Bank Executes Monetary Policy
- Monetary Policy and Economic Outcomes
- Pitfalls for Monetary Policy

Bring It Home

The Problem of the Zero Percent Interest Rate Lower Bound

Most economists believe that monetary policy (the manipulation of interest rates and credit conditions by a nation's central bank) has a powerful influence on a nation's economy. Monetary policy works when the central bank reduces interest rates and makes credit more available. As a result, business investment and other types of spending increase, causing GDP and employment to grow.

However, what if the interest rates banks pay are close to zero already? They cannot be made negative, can they? That would mean that lenders pay borrowers for the privilege of taking their money. Yet, this was the situation the U.S. Federal Reserve found itself in both at the end of the 2008–2009 recession and during the COVID-19 recession of 2020. The federal funds rate, which is the interest rate for banks that the Federal Reserve targets with its monetary policy, was slightly above 5% in 2007. By 2009, it had fallen to 0.16%. It then fell again from over 2% to 0.05% in March 2020.

During the Great Recession, the Federal Reserve's situation was further complicated because fiscal policy, the other major tool for managing the economy, was constrained by fears that the federal budget deficit and the public debt were already too high. What were the Federal Reserve's options? How could the Federal Reserve use monetary policy to stimulate the economy? And while fiscal policy was more aggressive in 2020, the economic situation has in some cases been more severe and additional financial support was necessary. The solution to the problem of the lower bound in both recessions, as we will see in this chapter, was to change the rules of the game.

Money, loans, and banks are all interconnected. Money is deposited in bank accounts, which is then loaned to businesses, individuals, and other banks. When the interlocking system of money, loans, and banks works well, economic transactions smoothly occur in goods and labor markets and savers are connected with borrowers. If the money and banking system does not operate smoothly, the economy can either fall into recession or suffer prolonged inflation.

The government of every country has public policies that support the system of money, loans, and banking. However, these policies do not always work perfectly. This chapter discusses how monetary policy works and what may prevent it from working perfectly.

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12.2: The Federal Reserve Banking System and Central Banks

Learning Objectives

By the end of this section, you will be able to:

- 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

In making decisions about the money supply, a central bank decides whether to raise or lower interest rates and, in this way, to influence macroeconomic policy, whose goal is low unemployment and low inflation. The central bank is also responsible for regulating all or part of the nation's banking system to protect bank depositors and insure the health of the bank's balance sheet.

We call the organization responsible for conducting monetary policy and ensuring that a nation's financial system operates smoothly the central bank. Most nations have central banks or currency boards. Some prominent central banks around the world include the European Central Bank, the Bank of Japan, and the Bank of England. In the United States, we call the central bank the Federal Reserve—often abbreviated as just "the Fed." This section explains the U.S. Federal Reserve's organization and identifies the major central bank's responsibilities.

Structure/Organization of the Federal Reserve

Unlike most central banks, the Federal Reserve is semi-decentralized, mixing government appointees with representation from private-sector banks. 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 governors can make policy decisions 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. The Fed's policy decisions do not require congressional approval, and the President cannot ask for a Federal Reserve Governor to resign as the President can with cabinet positions.

One member of the 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. From 2014 to 2018, Janet Yellen was the Chair. The current Chair is Jerome Powell. See the following Clear It Up feature to find out more about the former and current Chair.

Clear It Up

Who has the most immediate economic power in the world?



Figure 15.2 Chair of the Federal Reserve Board Jerome H. Powell (Credit: "_NZ79221" by Board of Governors of the Federal Reserve System/Flickr, Public Domain)

What individual can make a 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. The answer is the Chair of the Federal Reserve Board of Governors. In 2018, President Donald Trump appointed Jerome H. Powell to a 4-year term as chair of the Federal Reserve, replacing Janet Yellen, who served as the first female chair of the Federal Reserve from 2014–2018 and who now serves as the Treasury Secretary in the Biden

administration. In November 2021, Powell was nominated for a second term by President Biden; this appointment was confirmed in early-2022.

Powell played a pivotal role during the COVID-19 recession and its aftermath; in March 2020, under his leadership the Fed acted quickly to reduce the effective federal funds rate and expand its lending and bond-buying actions, similar to what Ben Bernanke did during the Great Recession. A centrist at heart, Powell has been criticized for fueling asset prices, even though in his many speeches and testimony before Congress he has consistently emphasized low unemployment rates and has been more tolerant of inflation than others on the Federal Reserve Board. Powell is not an academic economist by training or career—he has a J.D. from Georgetown Law and worked for many years at investment banks and on corporate boards—but this lack of "ivory tower" influences has helped guide a practical approach to economic problems, for which he is best known.

The Fed Chair is first among equals on the Board of Governors. While they have only one vote, the Chair controls the agenda, and is the Fed's public voice, so they have more power and influence than one might expect.

Link It Up

Visit this website to see who the current members of the Federal Reserve Board of Governors are. 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.

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. Figure 15.3 shows the Federal Reserve districts and the cities where their regional headquarters are located. 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.

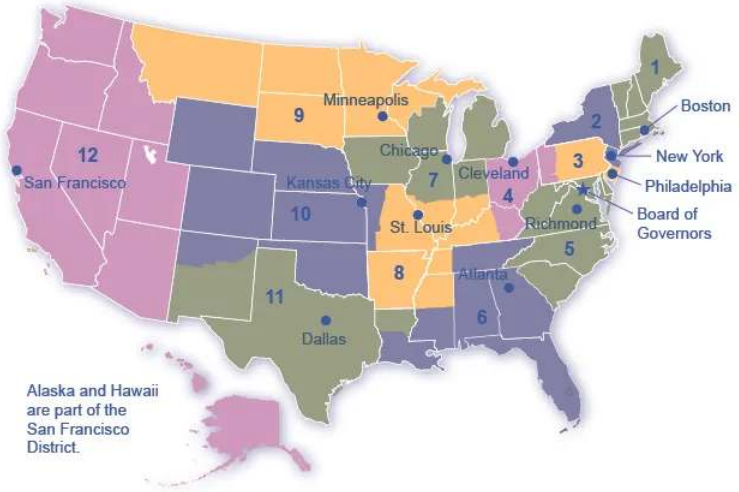


Figure 15.3 The Twelve Federal Reserve Districts There are twelve regional Federal Reserve banks, each with its district.

What Does a Central Bank Do?

The Federal Reserve, like most central banks, is designed to perform three important functions:

1. To conduct monetary policy
2. To promote stability of the financial system
3. To provide banking services to commercial banks and other depository institutions, and to provide banking services to the federal government.

The first two functions are sufficiently important that we will discuss them in their own modules. The third function we will discuss here.

The Federal Reserve 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. Similarly, banks can obtain loans from the Fed through the “discount window” facility, which we will discuss in more detail later. The Fed is also 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 grocery store's bank returns the physical check (or an image of that actual check) to your bank, after which it transfers funds from your bank account to the grocery store's account. 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 they distribute the loans geographically, as well as by sex and race of the loan applicants.

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12.3: Bank Regulation

Learning Objectives

By the end of this section, you will be able to:

- Discuss the relationship between bank regulation and monetary policy
- Explain bank supervision
- 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 Money and Banking, we learned that banks are required to hold a minimum percentage of their deposits on hand as reserves. "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, and their purpose is to cover desired withdrawals by depositors. 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.

Bank capital is the difference between a bank's assets and 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.

Link It Up

Visit this website to read the brief article, "Stop Confusing Monetary Policy and Bank Regulation."

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 about 5,000 credit unions in the U.S. economy today, although the typical credit union is small compared to most banks.

The Federal Reserve also has some responsibility for supervising financial institutions. For example, we call conglomerate firms that own banks and other businesses "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 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. As we discussed in Money and Banking, a bank's assets are its loans, and the value of these assets depends on estimates about the risk that customers will not repay these loans. 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.

Bank Runs

Back in the nineteenth century and during the first few decades of the twentieth century (around and during the Great Depression), putting your money in a bank could be nerve-wracking. Imagine that the net worth of your bank became negative, so that the bank's assets were not enough to cover its liabilities. In this situation, whoever withdrew their deposits first received all of their money, and those who did not rush to the bank quickly enough, lost their money. We call depositors racing to the bank to withdraw their deposits, as Figure 15.4 shows a bank run. 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.



Figure 15.4 A Run on the Bank Bank runs during the Great Depression only served to worsen the economic situation. (Credit: "Depression: "Runs on Banks" by National Archives and Records Administration, Public Domain)

The risk of bank runs created 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. Because a bank loans out most of the money it receives, and because it keeps only limited reserves on hand, a bank run of any size would quickly drain any of the bank's available cash. When the bank had no cash remaining, it only intensified the fears of remaining depositors that they could lose their money. Moreover, a bank run at one bank often triggered a chain reaction of runs on other banks. In the late nineteenth and early twentieth century, bank runs were typically not the original cause of a recession—but they could make a recession much worse.

Deposit Insurance

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 4,914 banks (as of the third quarter of 2021). 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 insured deposits. Bank runs no longer happen at insured banks.

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 (discussed below) 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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12.4: How a Central Bank Executes Monetary Policy

Learning Objectives

By the end of this section, you will be able to:

- Explain the reason for open market operations
- Evaluate reserve requirements and discount rates
- Interpret and show bank activity through balance sheets

The Federal Reserve's most important function is to conduct the nation's 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. Monetary policy involves managing interest rates and credit conditions, which influences the level of economic activity, as we describe in more detail below.

A central bank has three traditional tools to implement monetary policy in the economy:

- Open market operations
- Changing reserve requirements
- Changing the discount rate

In discussing how these three tools work, it is useful to think of the central bank as a "bank for banks"—that is, each private-sector bank has its own account at the central bank. We will discuss each of these monetary policy tools in the sections below.

Open Market Operations

Since the early 1920s, the most common monetary policy tool in the U.S. has been open market operations. These take place when the central bank sells or buys U.S. Treasury bonds in order to influence the quantity of bank reserves and the level of interest rates. The specific interest rate targeted in open market operations is the federal funds rate. The name is a bit of a misnomer since the federal funds rate is the interest rate that commercial banks charge making overnight loans to other banks. As such, it is a very short term interest rate, but one that reflects credit conditions in financial markets very well.

The Federal Open Market Committee (FOMC) makes the decisions regarding these open market operations. The FOMC comprises seven members of the Federal Reserve's Board of Governors. It also includes five voting members who the Board draws, on a rotating basis, from the regional Federal Reserve Banks. The New York district president is a permanent FOMC voting member and the Board fills other four spots on a rotating, annual basis, from the other 11 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 Federal Reserve's chairman 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.

To understand how open market operations affect the money supply, consider the balance sheet of Happy Bank, displayed in Figure 15.5. Figure 15.5 (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 Figure 15.5 (b) shows. However, Happy Bank only wants to hold $40 million in reserves (the quantity of reserves with which it started in Figure 15.5) (a), so the bank decides to loan out the extra $20 million in reserves and its loans rise by $20 million, as Figure 15.5(c) shows. The central bank's open market operation 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 that we discussed in Money and Banking.

Assets		Liabilities + Net Worth	
Reserves	40	Deposits	400

Figure 15.5

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.

Open market operations can also reduce the quantity of money and loans in an economy. Figure 15.6 (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 Figure 15.6 (b) shows. However, Happy Bank wants to hold $40 million in reserves, as in Figure 15.6 (a), so it will adjust down the quantity of its loans by $30 million, to bring its reserves back to the desired level, as Figure 15.6 (c) shows. 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 that we discussed in Money and Banking takes effect. What about all those bonds? How do they affect the money supply? Read the following Clear It Up feature for the answer.

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 15.6

Clear It Up

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 money supply 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.

The Federal Reserve was founded in the aftermath of the 1907 Financial Panic 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 bank run. As a result of the Panic, the Federal Reserve was founded to be the “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. We call the interest rate banks pay for such loans the discount rate. (They are so named because the bank makes loans against its 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.

The second traditional method for conducting monetary policy is to raise or lower 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 call in loans to replace those reserves. Since fewer loans are available, the money supply falls and market interest rates rise. If the central bank lowers the discount rate it charges to banks, the process works in reverse.

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 the Fed 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.

Changing Reserve Requirements

A potential third 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 central bank. If banks are required to hold a greater amount in reserves, they have less money available to lend out. If banks are allowed to hold a smaller amount in reserves, they will have a greater amount of money available to lend out.

Until very recently, the Federal Reserve required banks to hold reserves equal to 0% of the first $14.5 million in deposits, then to hold reserves equal to 3% of the deposits up to $103.6 million, and 10% of any amount above $103.6 million. The Fed makes small changes in the reserve requirements almost every year. For example, the $103.6 million dividing line is sometimes bumped up or down by a few million dollars. Today, these rates are no longer in effect; as of March 2020 (when the pandemic-induced recession hit), the 10% and 3% requirements were reduced to 0%, effectively eliminating the reserve requirement for all depository institutions.

The Fed rarely uses large changes in reserve requirements to execute monetary policy; the pandemic was an exception for obvious reasons. Also, a sudden demand that all banks increase their reserves would be extremely disruptive and difficult for them to comply. While loosening requirements too much might create a danger of banks' inability to meet withdrawal demands, the benefits of reducing the reserve requirements in March 2020 exceeded the risks.

Changing the Discount Rate

In the Federal Reserve Act, the phrase "...to afford means of rediscounting commercial paper" is contained in its long title. This was the main tool for monetary policy when the Fed was initially created. Today, the Federal Reserve has even more tools at its disposal, including quantitative easing, overnight repurchase agreements, and interest on excess reserves. This illustrates how monetary policy has evolved and how it continues to do so.

Link It Up

While these topics are beyond the scope of an introductory textbook, if you're interested in learning more about the Federal Reserve's newest policy tools, visit the Federal Reserve Bank of New York's page on large-scale asset purchases and the Federal Reserve Bank of St. Louis' FRED Blog post on fixing the textbook lag to learn more.

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12.5: Monetary Policy and Economic Outcomes

Learning Objectives

By the end of this section, you will be able to:

- Contrast expansionary monetary policy and contractionary monetary policy
- Explain how monetary policy impacts interest rates and aggregate demand
- Evaluate Federal Reserve decisions over the last forty years
- Explain the significance of quantitative easing (QE)

A monetary policy that lowers interest rates and stimulates borrowing is an expansionary monetary policy or loose monetary policy. Conversely, a monetary policy that raises interest rates and reduces borrowing in the economy is a contractionary monetary policy or tight monetary policy. This module will discuss how expansionary and contractionary monetary policies affect interest rates and aggregate demand, and how such policies will affect macroeconomic goals like unemployment and inflation. We will conclude with a look at the Fed's monetary policy practice in recent decades.

The Effect of Monetary Policy on Interest Rates

Consider the market for loanable bank funds in Figure 15.7. The original equilibrium (E_0) occurs at an 8% interest rate and a quantity of funds loaned and borrowed of $10 billion. An expansionary monetary policy 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 6% interest rate and a quantity $14 billion in loaned funds. Conversely, a contractionary monetary policy 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 10% interest rate and a quantity of $8 billion in loaned funds.

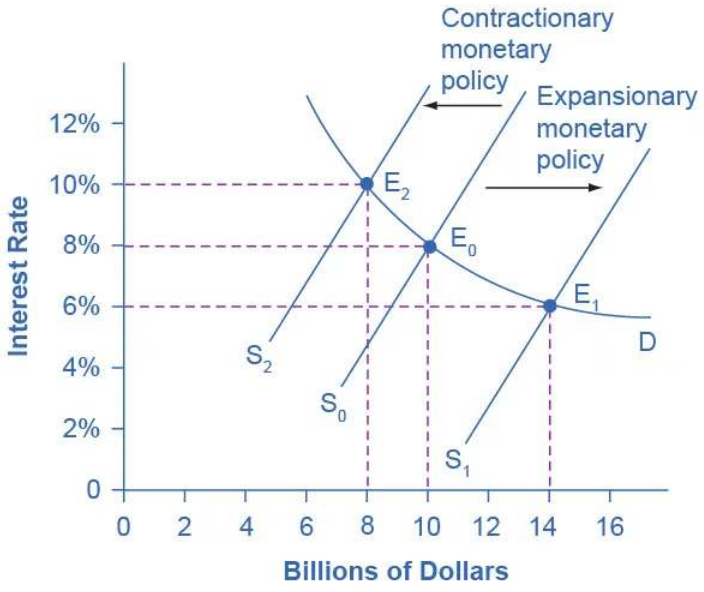


Figure 15.7 Monetary Policy and Interest Rates The original equilibrium occurs at E_0. An expansionary monetary policy will shift the supply of loanable funds to the right from the original supply curve (S_0) to the new supply curve (S_1) and to a new equilibrium of E_1, reducing the interest rate from 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%.

How does a central bank "raise" interest rates? When describing the central bank's monetary policy actions, 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. As a result, Figure 15.7 shows that interest rates change. If they do not meet the Fed's target, the Fed can supply more or less reserves 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 they must repay over different periods of time. 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 forces of supply and demand in those specific markets for lending and borrowing set the specific interest rates.

The Effect of Monetary Policy on 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.

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 15.8 (a) illustrates this situation. This example uses a short-run upward-sloping Keynesian aggregate supply curve (SRAS). The original equilibrium during a recession of E_0 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 (E_1) occurs at the potential GDP level of 700.

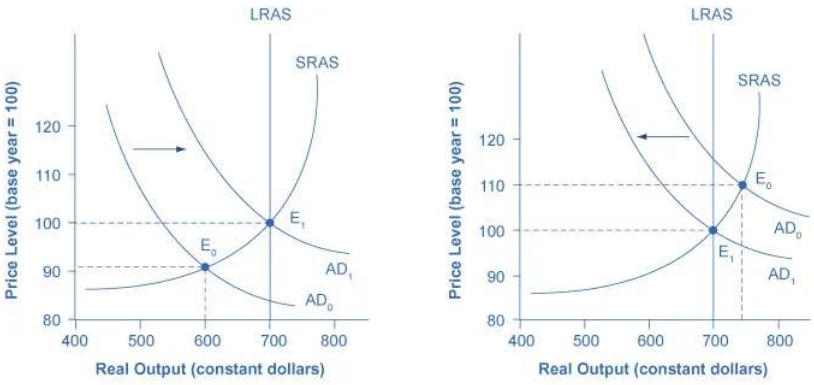


Figure 15.8 Expansionary or Contractionary Monetary Policy (a) The economy is originally in a recession with the equilibrium output and price shown at E_0. Expansionary monetary policy will reduce interest rates and shift aggregate demand to the right from AD_0 to AD_1, leading to the new equilibrium (E_1) 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 E_0 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 (E_1) 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 15.8 (b), the original equilibrium (E_0) 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 (E_1) 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. The Fed should loosen monetary policy when a recession has caused unemployment to increase and tighten it 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 15.9 (a) summarizes the chain of effects that connect loose and tight monetary policy to changes in output and the price level.

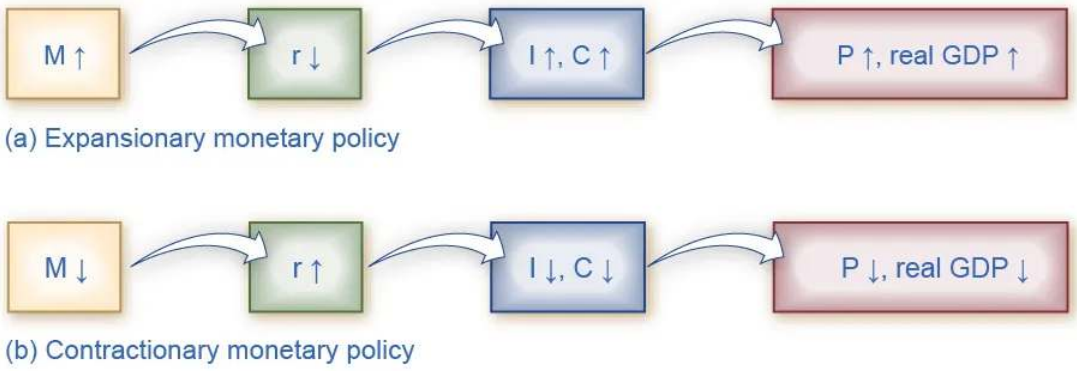


Figure 15.9 The Pathways of Monetary Policy (a) In expansionary monetary policy the central bank causes the supply of money and loanable funds to increase, which lowers the interest rate, stimulating additional borrowing for investment and consumption, and shifting aggregate demand right. The result 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.

Federal Reserve Actions Over Last Four Decades

For the period from 1970 through 2020, we can summarize Federal Reserve monetary policy by looking at how it targeted the federal funds interest rate using open market operations.

Of course, telling the story of the U.S. economy since 1970 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 ten episodes of Federal Reserve action outlined in the sections below also demonstrate that we should consider the central bank as one of the leading actors influencing the macro economy. As we noted earlier, the single person with the greatest power to influence the U.S. economy is probably the Federal Reserve chairperson.

Figure 15.10 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 1970. Different episodes of monetary policy during this period are indicated in the figure.

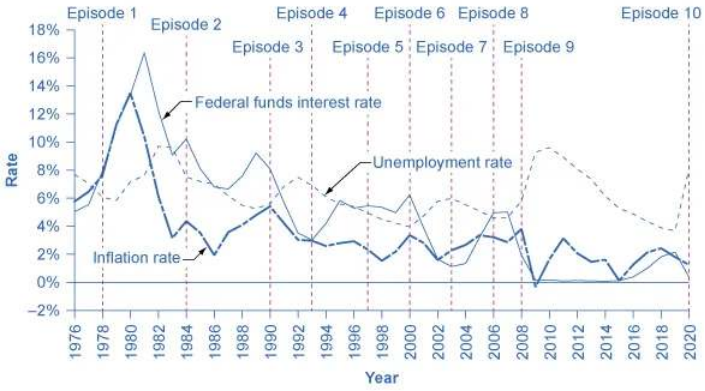


Figure 15.10 Monetary Policy, Unemployment, and Inflation Through the episodes here, the Federal Reserve typically reacted to higher inflation with a contractionary monetary policy and a higher interest rate, and reacted to higher unemployment with an expansionary monetary policy and a lower interest 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 economists persuaded the Federal Reserve 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 1990-1991 recession, 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.

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 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, 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.”

Episode 10

In Episode 10, which started in March 2020, the Fed cut interest rates again, reducing the target federal funds rate from 2% to between 0–1/4% in a matter of weeks. Limited by the zero lower bound, the Fed once again had to think “outside the box” in order to further support the financial system.

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. In 2008, however, it was impossible to stimulate the economy any further by lowering short term rates because they were already as low as they could get. (Read the closing Bring it Home feature for more on this.) Therefore, Chairman Bernanke sought to lower long-term rates utilizing quantitative easing.

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. During the financial crisis, which precipitated the recession, mortgage-backed securities were termed "toxic assets," because when the housing market collapsed, no one knew what these securities were worth, which put the financial institutions which were 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 stated that, when economic conditions permit, it will begin tapering (or reducing the monthly purchases). By October 2014, the Fed had announced the final $15 billion bond purchase, ending Quantitative Easing.

We usually think of the quantitative easing policies that the Federal Reserve adopted (as did other central banks around the world) as temporary emergency measures. If these steps are 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. The evidence suggests that QE_1 was somewhat successful, but that QE_2 and QE_3 have been less so.

Fast forward to March 2020, when the Fed under the leadership of Jerome Powell promised another round of asset purchases which was dubbed by some as "QE4," intended once again to provide liquidity to a distressed financial system in the wake of the pandemic. This round was much faster, increasing Fed assets by $2 trillion in just a few months. Recently, the Fed has begun to slow down the purchase of these assets once again through a taper, and the pace of the tapering is expected to increase through 2022. But as of the end of 2021, total Fed assets exceed $8 trillion, compared to $4 trillion in February 2020.

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12.6: Pitfalls for Monetary Policy

Learning Objectives

By the end of this section, you will be able to:

- Analyze whether monetary policy decisions should be made more democratically
- Calculate the velocity of money
- Evaluate the central bank's influence on inflation, unemployment, asset bubbles, and leverage cycles
- Calculate the effects of monetary stimulus

In the real world, effective monetary policy faces a number of significant hurdles. Monetary policy affects the economy only after a time lag that is typically long and of variable length. Remember, monetary policy involves a chain of events: the central bank must perceive a situation in the economy, hold a meeting, and make a decision to react by tightening or loosening monetary policy. 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.

As a result of this chain of events, monetary policy has little effect in the immediate future. Instead, its primary effects are felt perhaps one to three years in the future. The reality of long and variable time lags does not mean that a central bank should refuse to make decisions. It does mean that central banks should be humble about taking action, because of the risk that their actions can create as much or more economic instability as they resolve.

Excess Reserves

Banks are legally required to hold a minimum level of reserves, but no rule prohibits them from holding additional excess reserves above the legally mandated limit. For example, during a recession banks may be hesitant to lend, because they fear that when the economy is contracting, a high proportion of loan applicants become less likely to repay their loans.

When many banks are choosing to hold excess reserves, expansionary monetary policy may not work well. This may occur because the banks are concerned about a deteriorating economy, while the central bank is trying to expand the money supply. If the banks prefer to hold excess reserves above the legally required level, the central bank cannot force individual banks to make loans. Similarly, sensible businesses and consumers may be reluctant to borrow substantial amounts of money in a recession, because they recognize that firms' sales and employees' jobs are more insecure in a recession, and they do not want to face the need to make interest payments. The result is that during an especially deep recession, an expansionary monetary policy may have little effect on either the price level or the real GDP.

Japan experienced this situation in the 1990s and early 2000s. Japan's economy entered a period of very slow growth, dipping in and out of recession, in the early 1990s. By February 1999, the Bank of Japan had lowered the equivalent of its federal funds rate to 0%. It kept it there most of the time through 2003. Moreover, in the two years from March 2001 to March 2003, the Bank of Japan also expanded the country's money supply by about 50%—an enormous increase. Even this highly expansionary monetary policy, however, had no substantial effect on stimulating aggregate demand. Japan's economy continued to experience extremely slow growth into the mid-2000s.

Clear It Up

Should monetary policy decisions be made more democratically?

Should a nation's Congress or legislature comprised of elected representatives conduct monetary policy or should a politically appointed central bank that is more independent of voters take charge? Here are some of the arguments.

The Case for Greater Democratic Control of Monetary Policy

Elected representatives pass taxes and spending bills to conduct fiscal policy by passing tax and spending bills. They could handle monetary policy in the same way. They will sometimes make mistakes, but in a democracy, it is better to have elected officials who are accountable to voters make mistakes instead of political appointees. After all, the people appointed to the top

governing positions at the Federal Reserve—and to most central banks around the world—are typically bankers and economists. They are not representatives of borrowers like small businesses or farmers nor are they representatives of labor unions. Central banks might not be so quick to raise interest rates if they had to pay more attention to firms and people in the real economy.

The Case for an Independent Central Bank

Because the central bank has some insulation from day-to-day politics, its members can take a nonpartisan look at specific economic situations and make tough, immediate decisions when necessary. The idea of giving a legislature the ability to create money and hand out loans is likely to end up badly, sooner or later. It is simply too tempting for lawmakers to expand the money supply to fund their projects. The long term result will be rampant inflation. Also, a central bank, acting according to the laws passed by elected officials, can respond far more quickly than a legislature. For example, the U.S. budget takes months to debate, pass, and sign into law, but monetary policy decisions happen much more rapidly. Day-to-day democratic control of monetary policy is impractical and seems likely to lead to an overly expansionary monetary policy and higher inflation.

The problem of excess reserves does not affect contractionary policy. Central bankers have an old saying that monetary policy can be like pulling and pushing on a string: when the central bank pulls on the string and uses contractionary monetary policy, it can definitely raise interest rates and reduce aggregate demand. However, when the central bank tries to push on the string of expansionary monetary policy, the string may sometimes just fold up limp and have little effect, because banks decide not to loan out their excess reserves. Do not take this analogy too literally—expansionary monetary policy usually does have real effects, after that inconveniently long and variable lag. There are also times, like Japan's economy in the late 1990s and early 2000s, when expansionary monetary policy has been insufficient to lift a recession-prone economy.

Unpredictable Movements of Velocity

Velocity is a term that economists use to describe how quickly money circulates through the economy. We define the velocity of money in a year as:

Velocity = nominal GDPmoney supplyVelocity = nominal GDPmoney supply

Specific measurements of velocity depend on the definition of the money supply used. Consider the velocity of M1, the total amount of currency in circulation and checking account balances. In 2009, for example, M1 was $1.7 trillion and nominal GDP was $14.3 trillion, so the velocity of M1 was 8.4 (which is $14.3 trillion/$1.7 trillion). A higher velocity of money means that the average dollar circulates more times in a year. A lower velocity means that the average dollar circulates fewer times in a year.

See the following Clear It Up feature for a discussion of how deflation could affect monetary policy.

Clear It Up

What happens during episodes of deflation?

Deflation occurs when the rate of inflation is negative; that is, instead of money having less purchasing power over time, as occurs with inflation, money is worth more. Deflation can make it very difficult for monetary policy to address a recession.

Remember that the real interest rate is the nominal interest rate minus the rate of inflation. If the nominal interest rate is 7% and the rate of inflation is 3%, then the borrower is effectively paying a 4% real interest rate. If the nominal interest rate is 7% and there is *deflation* of 2%, then the real interest rate is actually 9%. In this way, an unexpected deflation raises the real interest payments for borrowers. It can lead to a situation where borrowers do not repay an unexpectedly high number of loans, and banks find that their net worth is decreasing or negative. When banks are suffering losses, they become less able and eager to make new loans. Aggregate demand declines, which can lead to recession.

Then the double-whammy: After causing a recession, deflation can make it difficult for monetary policy to work. Say that the central bank uses expansionary monetary policy to reduce the nominal interest rate all the way to zero—but the economy has 5% deflation. As a result, the real interest rate is 5%, and because a central bank cannot make the nominal interest rate negative, expansionary policy cannot reduce the real interest rate further.

In the U.S. economy during the early 1930s, deflation was 6.7% per year from 1930–1933, which caused many borrowers to default on their loans and many banks to end up bankrupt, which in turn contributed substantially to the Great Depression. Not all episodes of deflation, however, end in economic depression. Japan, for example, experienced deflation of slightly less than 1% per year from 1999–2002, which hurt the Japanese economy, but it still grew by about 0.9% per year over this period. There is at least one historical example of deflation coexisting with rapid growth. The U.S. economy experienced deflation of about 1.1% per year over the quarter-century from 1876–1900, but real GDP also expanded at a rapid clip of 4% per year over this time, despite some occasional severe recessions.

The central bank should be on guard against deflation and, if necessary, use expansionary monetary policy to prevent any long-lasting or extreme deflation from occurring. Except in severe cases like the Great Depression, deflation does not guarantee economic disaster.

Changes in velocity can cause problems for monetary policy. To understand why, rewrite the definition of velocity so that the money supply is on the left-hand side of the equation. That is:

Money supply × velocity = Nominal GDPMoney supply × velocity = Nominal GDP

Recall from The Macroeconomic Perspective that

Nominal GDP = Price Level (or GDP Deflator) × Real GDP.Nominal GDP = Price Level (or GDP Deflator) × Real GDP.

Therefore,

Money Supply × velocity = Nominal GDP = Price Level × Real GDP.Money Supply × velocity = Nominal GDP = Price Level × Real GDP.

We sometimes call this equation the basic quantity equation of money but, as you can see, it is just the definition of velocity written in a different form. This equation must hold true, by definition.

If velocity is constant over time, then a certain percentage rise in the money supply on the left-hand side of the basic quantity equation of money will inevitably lead to the same percentage rise in nominal GDP—although this change could happen through an increase in inflation, or an increase in real GDP, or some combination of the two. If velocity is changing over time but in a constant and predictable way, then changes in the money supply will continue to have a predictable effect on nominal GDP. If velocity changes unpredictably over time, however, then the effect of changes in the money supply on nominal GDP becomes unpredictable.

Figure 15.11 illustrates the actual velocity of money in the U.S. economy as measured by using M1, the most common definition of the money supply. From 1960 up to about 1980, velocity appears fairly predictable; that is, it is increasing at a fairly constant rate. In the early 1980s, however, velocity as calculated with M1 becomes more variable. The reasons for these sharp changes in velocity remain a puzzle. Economists suspect that the changes in velocity are related to innovations in banking and finance which have changed how we are using money in making economic transactions: for example, the growth of electronic payments; a rise in personal borrowing and credit card usage; and accounts that make it easier for people to hold money in savings accounts, where it is counted as M2, right up to the moment that they want to write a check on the money and transfer it to M1. So far at least, it has proven difficult to draw clear links between these kinds of factors and the specific up-and-down fluctuations in M1. Given many changes in banking and the prevalence of electronic banking, economists now favor M2 as a measure of money rather than the narrower M1.

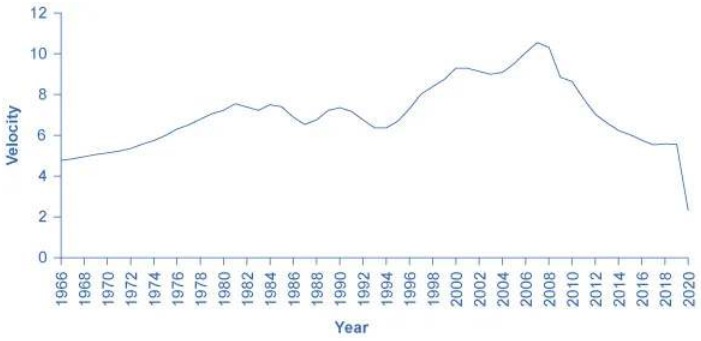
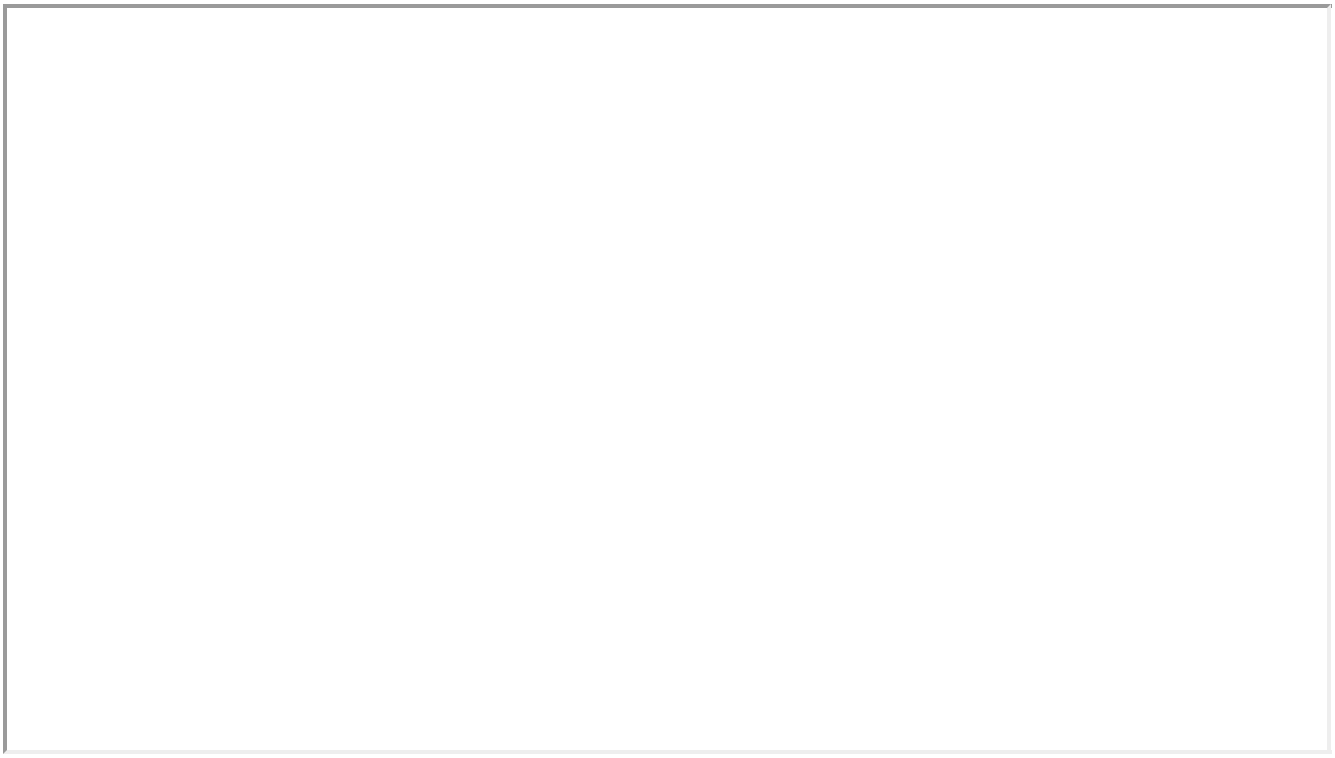


Figure 15.11 Velocity Calculated Using M1 Velocity is the nominal GDP divided by the money supply for a given year. We can calculate different measures of velocity by using different measures of the money supply. Velocity, as calculated by using M1, has lacked a steady trend since the 1980s, instead bouncing up and down. Note also that the redefinition of M1 to include savings deposits in 2020 (see Money and Banking) drastically increased M1 in 2020, causing velocity to plummet. (credit: Federal Reserve Bank of St. Louis)

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Velocity Calculated Using M1

In the 1970s, when velocity as measured by M1 seemed predictable, a number of economists, led by Nobel laureate Milton Friedman (1912–2006), argued that the best monetary policy was for the central bank to increase the money supply at a constant growth rate. These economists argued that with the long and variable lags of monetary policy, and the political pressures on central bankers, central bank monetary policies were as likely to have undesirable as to have desirable effects. Thus, these economists believed that the monetary policy should seek steady growth in the money supply of 3% per year. They argued that a steady monetary growth rate would be correct over longer time periods, since it would roughly match the growth of the real economy. In addition, they argued that giving the central bank less discretion to conduct monetary policy would prevent an overly activist central bank from becoming a source of economic instability and uncertainty. In this spirit, Friedman wrote in 1967: “The first and most important lesson that history teaches about what monetary policy can do—and it is a lesson of the most profound importance—is that monetary policy can prevent money itself from being a major source of economic disturbance.”

As the velocity of M1 began to fluctuate in the 1980s, having the money supply grow at a predetermined and unchanging rate seemed less desirable, because as the quantity theory of money shows, the combination of constant growth in the money supply and fluctuating velocity would cause nominal GDP to rise and fall in unpredictable ways. The jumpiness of velocity in the 1980s caused many central banks to focus less on the rate at which the quantity of money in the economy was increasing, and instead to set monetary policy by reacting to whether the economy was experiencing or in danger of higher inflation or unemployment.

Unemployment and Inflation

If you were to survey central bankers around the world and ask them what they believe should be the primary task of monetary policy, the most popular answer by far would be fighting inflation. Most central bankers believe that the neoclassical model of economics accurately represents the economy over the medium to long term. Remember that in the neoclassical model of the economy, we draw the aggregate supply curve as a vertical line at the level of potential GDP, as Figure 15.12 shows. In the

neoclassical model, economists determine the level of potential GDP (and the natural rate of unemployment that exists when the economy is producing at potential GDP) by real economic factors. If the original level of aggregate demand is AD_0, then an expansionary monetary policy that shifts aggregate demand to AD_1 only creates an inflationary increase in the price level, but it does not alter GDP or unemployment. From this perspective, all that monetary policy can do is to lead to low inflation or high inflation—and low inflation provides a better climate for a healthy and growing economy. After all, low inflation means that businesses making investments can focus on real economic issues, not on figuring out ways to protect themselves from the costs and risks of inflation. In this way, a consistent pattern of low inflation can contribute to long-term growth.

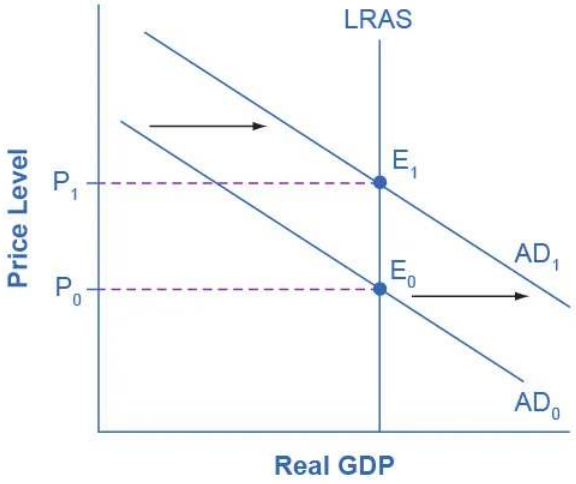


Figure 15.12 Monetary Policy in a Neoclassical Model In a neoclassical view, monetary policy affects only the price level, not the level of output in the economy. For example, an expansionary monetary policy causes aggregate demand to shift from the original AD_0 to AD_1. However, the adjustment of the economy from the original equilibrium (E_0) to the new equilibrium (E_1) represents an inflationary increase in the price level from P_0 to P_1, but has no effect in the long run on output or the unemployment rate. In fact, no shift in AD will affect the equilibrium quantity of output in this model.

This vision of focusing monetary policy on a low rate of inflation is so attractive that many countries have rewritten their central banking laws since in the 1990s to have their bank practice inflation targeting, which means that the central bank is legally required to focus primarily on keeping inflation low. By 2014, central banks in 28 countries, including Austria, Brazil, Canada, Israel, Korea, Mexico, New Zealand, Spain, Sweden, Thailand, and the United Kingdom faced a legal requirement to target the inflation rate. A notable exception is the Federal Reserve in the United States, which does not practice inflation-targeting. Instead, the law governing the Federal Reserve requires it to take both unemployment and inflation into account.

Economists have no final consensus on whether a central bank should be required to focus only on inflation or should have greater discretion. For those who subscribe to the inflation targeting philosophy, the fear is that politicians who are worried about slow economic growth and unemployment will constantly pressure the central bank to conduct a loose monetary policy—even if the economy is already producing at potential GDP. In some countries, the central bank may lack the political power to resist such pressures, with the result of higher inflation, but no long-term reduction in unemployment. The U.S. Federal Reserve has a tradition of independence, but central banks in other countries may be under greater political pressure. For all of these reasons—long and variable lags, excess reserves, unstable velocity, and controversy over economic goals—monetary policy in the real world is often difficult. The basic message remains, however, that central banks can affect aggregate demand through the conduct of monetary policy and in that way influence macroeconomic outcomes.

Asset Bubbles and Leverage Cycles

One long-standing concern about having the central bank focus on inflation and unemployment is that it may be overlooking certain other economic problems that are coming in the future. For example, from 1994 to 2000 during what was known as the “dot-com” boom, the U.S. stock market, which the Dow Jones Industrial Index measures (which includes 30 very large companies from across the U.S. economy), nearly tripled in value. The Nasdaq index, which includes many smaller technology companies, increased in value by a multiple of five from 1994 to 2000. These rates of increase were clearly not sustainable. Stock values as measured by the Dow Jones were almost 20% lower in 2009 than they had been in 2000. Stock values in the Nasdaq index were

50% lower in 2009 than they had been in 2000. The drop-off in stock market values contributed to the 2001 recession and the higher unemployment that followed.

We can tell a similar story about housing prices in the mid-2000s. During the 1970s, 1980s, and 1990s, housing prices increased at about 6% per year on average. During what came to be known as the "housing bubble" from 2003 to 2005, housing prices increased at almost double this annual rate. These rates of increase were clearly not sustainable. When housing prices fell in 2007 and 2008, many banks and households found that their assets were worth less than they expected, which contributed to the recession that started in 2007.

At a broader level, some economists worry about a leverage cycle, where "leverage" is a term financial economists use to mean "borrowing." When economic times are good, banks and the financial sector are eager to lend, and people and firms are eager to borrow. Remember that a money multiplier determines the amount of money and credit in an economy —a process of loans made, money deposited, and more loans made. In good economic times, this surge of lending exaggerates the episode of economic growth. It can even be part of what lead prices of certain assets—like stock prices or housing prices—to rise at unsustainably high annual rates. At some point, when economic times turn bad, banks and the financial sector become much less willing to lend, and credit becomes expensive or unavailable to many potential borrowers. The sharp reduction in credit, perhaps combined with the deflating prices of a dot-com stock price bubble or a housing bubble, makes the economic downturn worse than it would otherwise be.

Thus, some economists have suggested that the central bank should not just look at economic growth, inflation, and unemployment rates, but should also keep an eye on asset prices and leverage cycles. Such proposals are quite controversial. If a central bank had announced in 1997 that stock prices were rising "too fast" or in 2004 that housing prices were rising "too fast," and then taken action to hold down price increases, many people and their elected political representatives would have been outraged. Neither the Federal Reserve nor any other central banks want to take the responsibility of deciding when stock prices and housing prices are too high, too low, or just right. As further research explores how asset price bubbles and leverage cycles can affect an economy, central banks may need to think about whether they should conduct monetary policy in a way that would seek to moderate these effects.

Let's end this chapter with a Work it Out exercise in how the Fed—or any central bank—would stir up the economy by increasing the money supply.

Work It Out

Calculating the Effects of Monetary Stimulus

Suppose that the central bank wants to stimulate the economy by increasing the money supply. The bankers estimate that the velocity of money is 3, and that the price level will increase from 100 to 110 due to the stimulus. Using the quantity equation of money, what will be the impact of an $800 billion dollar increase in the money supply on the quantity of goods and services in the economy given an initial money supply of $4 trillion?

Step 1. We begin by writing the quantity equation of money: MV = PQ. We know that initially V = 3, M = 4,000 (billion) and P = 100. Substituting these numbers in, we can solve for Q:

MV = PQ4,000 × 3 = 100 × QQ = 120MV = PQ4,000 × 3 = 100 × QQ = 120

Step 2. Now we want to find the effect of the addition $800 billion in the money supply, together with the increase in the price level. The new equation is:

MV = PQ4,800 × 3 = 110 × QQ = 130.9MV = PQ4,800 × 3 = 110 × QQ = 130.9

Step 3. If we take the difference between the two quantities, we find that the monetary stimulus increased the quantity of goods and services in the economy by 10.9 billion.

The discussion in this chapter has focused on domestic monetary policy; that is, the view of monetary policy within an economy. Exchange Rates and International Capital Flows explores the international dimension of monetary policy, and how monetary policy becomes involved with exchange rates and international flows of financial capital.

Bring It Home

The Problem of the Zero Percent Interest Rate Lower Bound

In 2008, the U.S. Federal Reserve found itself in a difficult position. The federal funds rate was on its way to near zero, which meant that traditional open market operations, by which the Fed purchases U.S. Treasury Bills to lower short term interest rates, was no longer viable. This so called “zero bound problem,” prompted the Fed, under then Chair Ben Bernanke, to attempt some unconventional policies, collectively called quantitative easing. By early 2014, quantitative easing nearly quintupled the amount of bank reserves. This likely contributed to the U.S. economy’s recovery, but the impact was muted, probably due to some of the hurdles mentioned in the last section of this module. The unprecedented increase in bank reserves also led to fears of inflation, which never bore out. Throughout the 2010s there have been no serious signs of inflation with core inflation around a stable 1.5–2%. As of early 2015, however, there have been no serious signs of a boom, with core inflation around a stable 1.7%.

The Zero Lower Bound was encountered again in 2020 due to the pandemic, when the target federal funds rate dropped by over two percentage points in a matter of weeks. The Fed further responded by increasing asset purchases by an even greater amount, and at a faster rate, than in 2009. When the U.S. started experiencing higher-than-average inflation in 2021, the Fed chair Jerome Powell responded to criticisms by saying that the Fed was poised to consider rate increases and start tapering the rate of asset purchases into 2022. It remains to be seen whether inflation can be tamed moving forward, or if more aggressive policy measures will be required.

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12.7: Key Terms

bank run
when depositors race to the bank to withdraw their deposits for fear that otherwise they would be lost

basic quantity equation of money
money supply × velocity = nominal GDP

central bank
institution which conducts a nation's monetary policy and regulates its banking system

contractionary monetary policy
a monetary policy that reduces the supply of money and loans

countercyclical
moving in the opposite direction of the business cycle of economic downturns and upswings

deposit insurance
an insurance system that makes sure depositors in a bank do not lose their money, even if the bank goes bankrupt

discount rate
the interest rate charged by the central bank on the loans that it gives to other commercial banks

excess reserves
reserves banks hold that exceed the legally mandated limit

expansionary monetary policy
a monetary policy that increases the supply of money and the quantity of loans

federal funds rate
the interest rate at which one bank lends funds to another bank overnight

inflation targeting
a rule that the central bank is required to focus only on keeping inflation low

lender of last resort
an institution that provides short-term emergency loans in conditions of financial crisis

loose monetary policy
see expansionary monetary policy

open market operations
the central bank selling or buying Treasury bonds to influence the quantity of money and the level of interest rates

quantitative easing (QE)
the purchase of long term government and private mortgage-backed securities by central banks to make credit available in hopes of stimulating aggregate demand

reserve requirement
the percentage amount of its total deposits that a bank is legally obligated to either hold as cash in their vault or deposit with the central bank

tight monetary policy

see contractionary monetary policy

velocity

the speed with which money circulates through the economy; calculated as the nominal GDP divided by the money supply

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12.8: Key Concepts and Summary

15.1 The Federal Reserve Banking System and Central Banks

The most prominent task of a central bank is to conduct monetary policy, which involves changes to interest rates and credit conditions, affecting the amount of borrowing and spending in an economy. Some prominent central banks around the world include the U.S. Federal Reserve, the European Central Bank, the Bank of Japan, and the Bank of England.

15.2 Bank Regulation

A bank run occurs when there are rumors (possibly true, possibly false) that a bank is at financial risk of having negative net worth. As a result, depositors rush to the bank to withdraw their money and put it someplace safer. Even false rumors, if they cause a bank run, can force a healthy bank to lose its deposits and be forced to close. Deposit insurance guarantees bank depositors that, even if the bank has negative net worth, their deposits will be protected. In the United States, the Federal Deposit Insurance Corporation (FDIC) collects deposit insurance premiums from banks and guarantees bank deposits up to $250,000. Bank supervision involves inspecting the balance sheets of banks to make sure that they have positive net worth and that their assets are not too risky. In the United States, the Office of the Comptroller of the Currency (OCC) is responsible for supervising banks and inspecting savings and loans and the National Credit Union Administration (NCUA) is responsible for inspecting credit unions. The FDIC and the Federal Reserve also play a role in bank supervision.

When a central bank acts as a lender of last resort, it makes short-term loans available in situations of severe financial panic or stress. The failure of a single bank can be treated like any other business failure. Yet if many banks fail, it can reduce aggregate demand in a way that can bring on or deepen a recession. The combination of deposit insurance, bank supervision, and lender of last resort policies help to prevent weaknesses in the banking system from causing recessions.

15.3 How a Central Bank Executes Monetary Policy

A central bank has three traditional tools to conduct monetary policy: open market operations, which involves buying and selling government bonds with banks; reserve requirements, which determine what level of reserves a bank is legally required to hold; and discount rates, which is the interest rate charged by the central bank on the loans that it gives to other commercial banks. The most commonly used tool is open market operations.

15.4 Monetary Policy and Economic Outcomes

An expansionary (or loose) monetary policy raises the quantity of money and credit above what it otherwise would have been and reduces interest rates, boosting aggregate demand, and thus countering recession. A contractionary monetary policy, also called a tight monetary policy, reduces the quantity of money and credit below what it otherwise would have been and raises interest rates, seeking to hold down inflation. During the 2008–2009 recession, central banks around the world also used quantitative easing to expand the supply of credit.

15.5 Pitfalls for Monetary Policy

Monetary policy is inevitably imprecise, for a number of reasons: (a) the effects occur only after long and variable lags; (b) if banks decide to hold excess reserves, monetary policy cannot force them to lend; and (c) velocity may shift in unpredictable ways. The basic quantity equation of money is MV = PQ, where M is the money supply, V is the velocity of money, P is the price level, and Q is the real output of the economy. Some central banks, like the European Central Bank, practice inflation targeting, which means that the only goal of the central bank is to keep inflation within a low target range. Other central banks, such as the U.S. Federal Reserve, are free to focus on either reducing inflation or stimulating an economy that is in recession, whichever goal seems most important at the time.

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CHAPTER OVERVIEW

13: Government Budgets and Fiscal Policy

13.1: Introduction to Government Budgets and Fiscal Policy
13.2: Government Spending
13.3: Taxation
13.4: Federal Deficits and the National Debt
13.5: Using Fiscal Policy to Fight Recession, Unemployment, and Inflation
13.6: Automatic Stabilizers
13.7: Practical Problems with Discretionary Fiscal Policy
13.8: The Question of a Balanced Budget
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13.1: Introduction to Government Budgets and Fiscal Policy



Figure 17.1 Shut Downs and Parks Yellowstone National Park is one of the many national parks forced to close operations during the government shut down in 2013 and 2018–2019. (Credit: modification of “Close up of sign” by David Fulmer/Flickr Creative Commons, CC BY 2.0)

Chapter Objectives

In this chapter, you will learn about:

- Government Spending
- Taxation
- Federal Deficits and the National Debt
- Using Fiscal Policy to Fight Recessions, Unemployment, and Inflation
- Automatic Stabilizers
- Practical Problems with Discretionary Fiscal Policy
- The Question of a Balanced Budget

Bring It Home

No Yellowstone Park?

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. Two thirds of the budget are entitlements and other mandatory spending which occur without congressional or presidential action once the programs are established. Tied to the budget debate was the issue of increasing the debt ceiling—how high the U.S. government's national debt 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 progressed, the United States came very close to defaulting on its debt.

October 2013 was not the first time the government shut down, and it was not the last. Several brief shutdowns occurred in the early 1980s, and they occurred periodically in the following years. The longest shutdown took place between December 2018 and January 2019, when funding a border wall was a core disagreement.

> Why does the federal budget create such intense debates? What would happen if the United States actually defaulted on its debt? In this chapter, we will examine the federal budget, taxation, and fiscal policy. We will also look at the annual federal budget deficits and the national debt.

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. Budgets, however, can shift dramatically within a few years, as policy decisions and unexpected events disrupt earlier tax and spending plans.

In this chapter, we revisit fiscal policy, which we first covered in Welcome to Economics! Fiscal policy is one of two policy tools for fine tuning the economy (the other is monetary policy). While policymakers at the Federal Reserve make monetary policy, Congress and the President make fiscal policy.

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 federal government policies. We begin with an overview of U.S. government spending and taxes. We then 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.

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13.2: Government Spending

Learning Objectives

By the end of this section, you will be able to:

- Identify U.S. budget deficit and surplus trends over the past five decades
- Explain the differences between the U.S. federal budget, and state and local budgets

Government spending covers a range of services that the federal, state, and local governments provide. 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 has a balanced budget. For example, in 2020, the U.S. government experienced its largest budget deficit ever, as the federal government spent $3.1 trillion more than it collected in taxes. This deficit was about 15% of the size of the U.S. GDP in 2020, making it by far the largest budget deficit relative to GDP since the mammoth borrowing the government used to finance World War II. To put it into perspective, the previous record deficits were experienced during the Great Recession of 2007–2009, when the deficit reached 9.6% of GDP.

This section presents an overview of government spending in the United States.

Total U.S. Government Spending

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 $93.4 billion in 1960 to $6.8 trillion in 2020. Comparing spending over time in nominal dollars is misleading because it does not take into account inflation or growth in population and 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 17.2 shows the federal spending level 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. For example, throughout the latter part of the 2010s, government expenditures were around 20% of GDP. The other lines in Figure 17.2 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). State governments also partially fund Medicaid. Interest payments are the final main category of government spending in Figure 30.2.

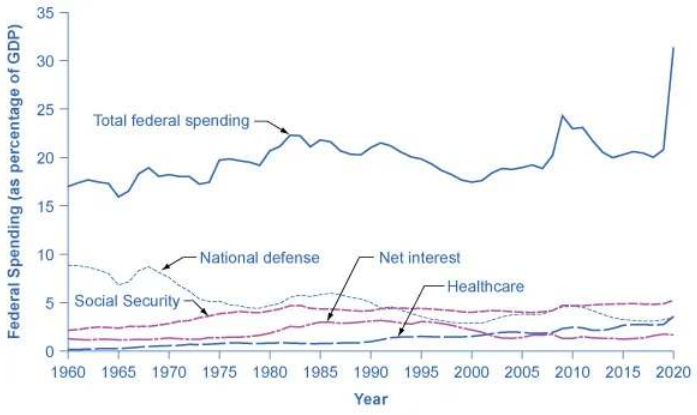


Figure 17.2 Federal Spending, 1960–2020 Since 1960, total federal spending has ranged from about 18% to 22% of GDP. It climbed above that level in 2009, quickly dropped back down to that level by 2013, and again climbed above that level in 2020. The share that the government has spent on national defense 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*, 2021, Table B47, https://www.govinfo.gov/app/collection/erp/2021)

Each year, the government borrows funds from U.S. citizens and foreigners to cover its budget deficits. 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.

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 1.6% of GDP by 2020.

We investigate the government borrowing and debt patterns in more detail later in this chapter, but first we need to clarify the difference between the deficit and the debt. *The deficit is not the debt*. The difference between the deficit and the debt lies in the time frame. The government deficit (or surplus) refers to what happens with the federal government budget each year. The 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.

These four categories—national defense, Social Security, healthcare, and interest payments—generally account for roughly 60% of all federal spending, as Figure 17.3 shows. (Due to the large amount of one-time expenditures by the federal government in 2020 due to the pandemic, the 2019 statistics are presented here.) The remaining 40% 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 people in poverty; community and regional development; law enforcement and the judicial system; and the administrative costs of running the government.

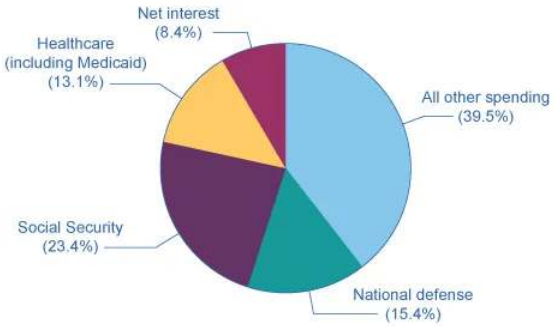


Figure 17.3 Slices of Federal Spending, 2019 About 60% of government spending goes to four major areas: national defense, Social Security, healthcare, and interest payments on past borrowing. This leaves about 40% of federal spending for all other functions of the U.S. government. (Source: www.whitehouse.gov/omb/budget/Historicals/)

State and Local Government Spending

Although federal government spending often gets most of the media attention, state and local government spending is also substantial—at about $3.3 trillion in 2021. Figure 17.4 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.

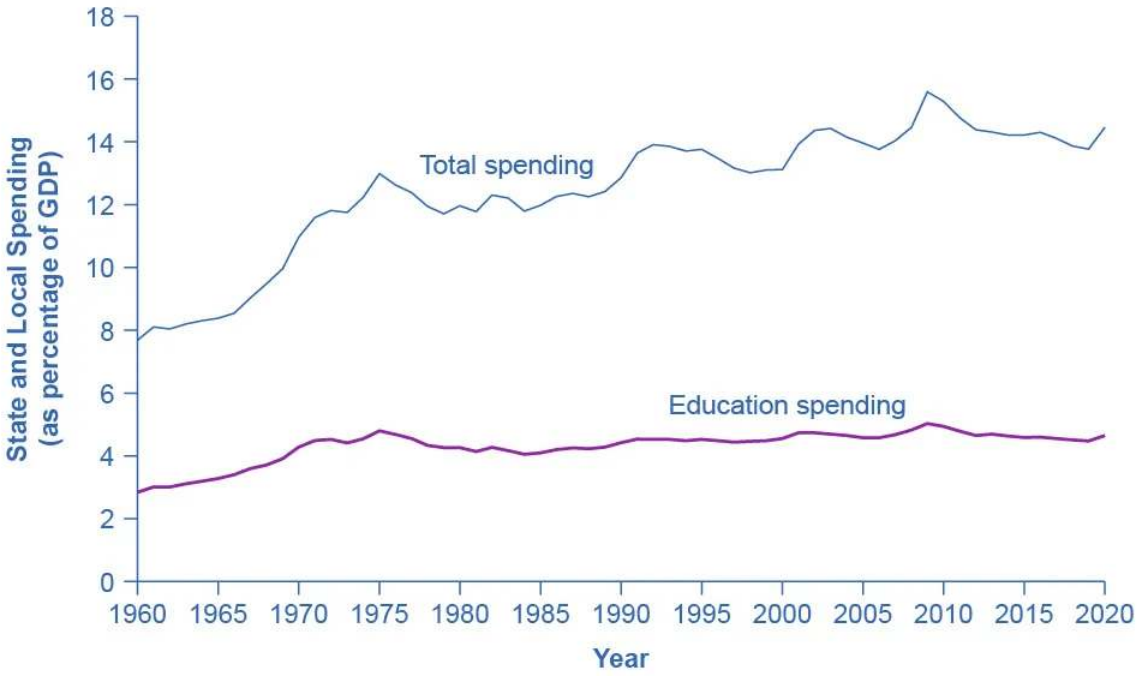


Figure 17.4 State and Local Spending, 1960–2020 Spending by state and local government increased from about 10% of GDP in the early 1960s to 14–16% by the mid-1970s. It has remained at roughly that level since. The single biggest spending item is education, including both K–12 spending and support for public colleges and universities, which has been about 4–5% of GDP in recent decades. Source: (Source: Bureau of Economic Analysis, https://apps.bea.gov/iTable/index_nipa.cfm.)

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. government system, these tasks are primarily state and local government responsibilities. In fiscal year 2020 state and local governments spent about $970 billion per year on education (including K–12 and college and university education), compared to only $100 billion by the federal government. 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.

Taxes are paid by most, but not all, people who work. Even if you are part of the so-called “1099” or “gig” economy, you are considered an independent contractor and must pay taxes on the income you earn in those occupations. Taxes are also paid by consumers whenever they purchase goods and services. Taxes are used for all sorts of spending—from roads, to bridges, to schools (K–12 and public higher education), to police and other public safety functions. Taxes fund vital public services that support our communities.

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13.3: Taxation

Learning Objectives

By the end of this section, you will be able to:

- Differentiate among a regressive tax, a proportional tax, and a progressive tax
- Identify major revenue sources for the U.S. federal budget

There are two main categories of taxes: those that the federal government collects and those that the state and local governments collect. What percentage the government collects and for what it uses that revenue varies greatly. The following sections will briefly explain the taxation system in the United States.

Taxes are paid by most, but not all, people who work. Even if you are part of the so-called “1099” or “gig” economy, you are considered an independent contractor and must pay taxes on the income you earn in those occupations. Taxes are also paid by consumers whenever they purchase goods and services. Taxes are used for all sorts of spending—from roads, to bridges, to schools (K–12 and public higher education), to police and other public safety functions. Taxes fund vital public services that support our communities.

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 17.5 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 2009–2011, when taxes fell substantially below this level, due to the Great Recession.

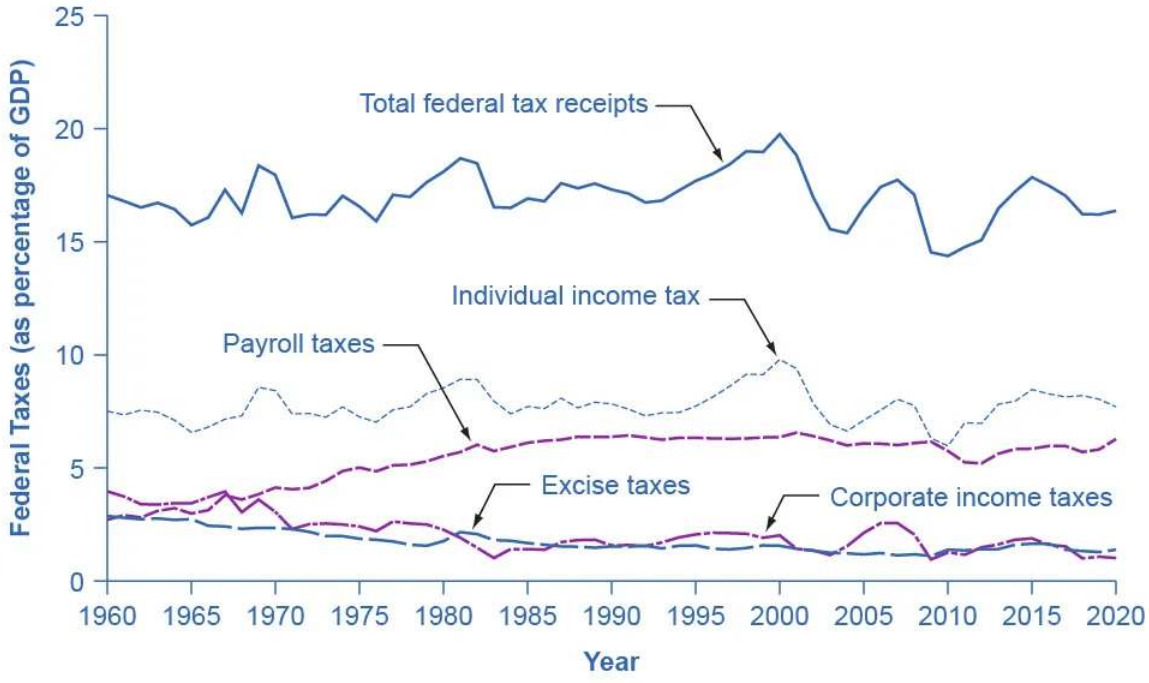


Figure 17.5 Federal Taxes, 1960–2020 Federal tax revenues have been about 17–20% of GDP during most periods in recent decades. The primary sources of federal taxes are individual income taxes and the payroll taxes that finance Social Security and Medicare. Corporate income taxes and social insurance taxes provide smaller shares of revenue. (Source: *Economic Report of the President, 2021*. Table B-47, https://www.govinfo.gov/app/collection/erp/2021)

Figure 17.5 also shows the taxation patterns for the main categories that the federal government taxes: individual income taxes, corporate income taxes, and social insurance and retirement receipts. When most people think of federal government taxes, 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 (captured in social insurance and retirement receipts), 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 over 85% of federal tax revenues in 2020. 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.

The income tax is a progressive tax, which means that the tax rates increase as a household's income increases. Taxes also vary with marital status, family size, and other factors. The marginal tax rates (the tax due on all yearly income) for a single taxpayer range from 10% to 35%, depending on income, as the following Clear It Up feature explains.

Clear It Up

How does the marginal 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 $137,700 in 2020. 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 their 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. If you are a member of the "gig economy" and receive a 1099 tax statement, then you are considered an independent contractor and so you must pay the employee and employer side of the payroll tax.

We also call the Medicare payroll tax a proportional tax; that is, a flat percentage of all wages earned. 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.

The third-largest source of federal tax revenue, as Figure 17.5 shows 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 past 40 years.

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 the government collects from these taxes has stayed nearly constant over time, from about 2% of GDP in the 1960s to roughly 3% by 2020, 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 2020. By a quirk of legislation, the government repealed the estate and gift tax in 2010, but reinstated it in 2011. Other federal taxes, which are also relatively small in magnitude, include tariffs the government collects on imported goods and charges for inspections of goods entering the country.

State and Local Taxes

At the state and local level, taxes have been rising as a share of GDP over the last few decades to match the gradual rise in spending, as Figure 17.6 illustrates. 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. 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.

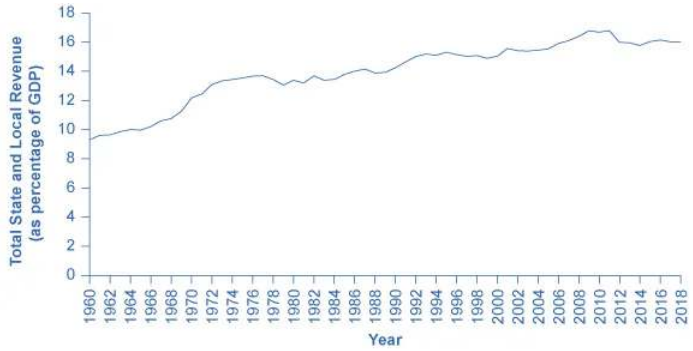


Figure 17.6 State and Local Tax Revenue as a Share of GDP, 1960–2020 State and local tax revenues have increased to match the rise in state and local spending. (Source: *Economic Report of the President*, *2020*. Table B-50, https://www.govinfo.gov/app/collection/erp/2021)

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13.4: Federal Deficits and the National Debt

Learning Objectives

By the end of this section, you will be able to:

- Explain the U.S. federal budget in terms of annual debt and accumulated debt
- Understand 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 17.7 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, 2007–2009 (the Great Recession), and 2020 (the pandemic-induced recession).

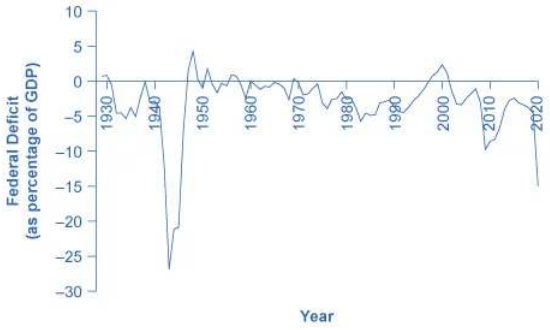


Figure 17.7 Pattern of Federal Budget Deficits and Surpluses, 1929–2020 The federal government has run budget deficits for decades. The budget was briefly in surplus in the late 1990s, before heading into deficit again in the first decade of the 2000s—and especially deep deficits in the 2007-2009 and 2020 recessions. (Source: Federal Reserve Bank of St. Louis (FRED). http://research.stlouisfed.org/fred2...es/FYFSGDA188S)

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Federal Surplus or Deficit as a Percentage of Gross Domestic Product

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 17.8 shows the ratio of debt/GDP since 1966. 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. There was another leap in the ratio in 2020.

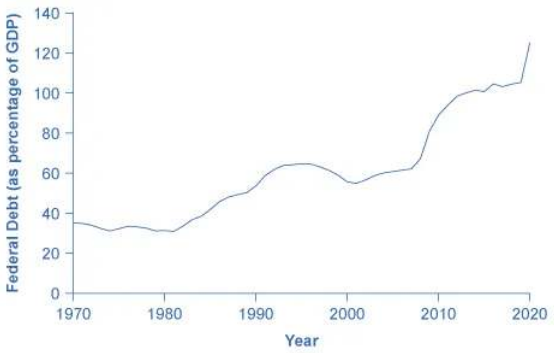


Figure 17.8 Federal Debt as a Percentage of GDP, 1942–2014 Federal debt is the sum of annual budget deficits and surpluses. Annual deficits do not always mean that the debt/GDP ratio is rising. During the 1960s and 1970s, the government often ran small deficits, but since the debt was growing more slowly than the economy, the debt/GDP ratio was declining over this time. In the 2008–2009 recession, the debt/GDP ratio rose sharply, before leveling off through the later 2010s. In 2020, it rose sharply again. (Source: https://fred.stlouisfed.org/series/GFDEGDQ188S)

The next Clear it Up feature discusses how the government handles the national debt.

Clear It Up

What is the national debt?

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.

Click to view content

Gross Federal Debt as a Percentage of Gross Domestic Product

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 in 2020? Figure 17.9 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.

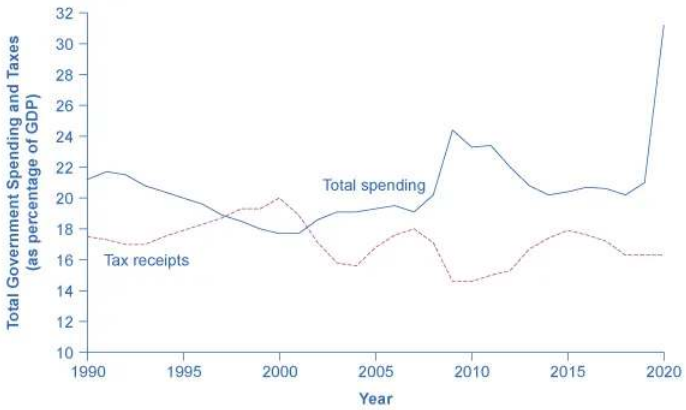


Figure 17.9 Total Government Spending and Taxes as a Share of GDP, 1990–2014 When government spending exceeds taxes, the gap is the budget deficit. When taxes exceed spending, the gap is a budget surplus. The recessionary period starting in late 2007

saw higher spending and lower taxes, combining to create a large deficit in 2009. The same thing happened in a more extreme way in 2020. (Source: *Economic Report of the President*, *Tables B-46*, https://www.govinfo.gov/app/collection/erp/2021)

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.

Longer-term U.S. budget forecasts, a decade or more into the future, predict enormous deficits. The higher deficits during the 2007–2009 Great Recession and the 2020 pandemic-induced 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 reached age 65, and in the next two decades, the proportion of Americans over the age of 65 will increase substantially. During the 2020 recession, we saw another wave of early retirements, and we are now in the middle of this major demographic shift. 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 increasingly large budget deficits. A decision to collect more revenue to support these programs or to decrease benefit levels would alter this long-term forecast.

Clear It Up

What is the long-term budget outlook for Social Security and Medicare?

In 1946, just one American in 13 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 2021 are that Medicare and Social Security spending combined will rise from 8.7% of GDP in 2021 to about 10.8% by 2027–2031. 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.

In the next module we shift to the use of fiscal policy to counteract business cycle fluctuations. In addition, we will explore proposals requiring a balanced budget—that is, for government spending and taxes to be equal each year. The Impacts of

Government Borrowing will also cover how fiscal policy and government borrowing will affect national saving—and thus affect economic growth and trade imbalances.

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13.5: Using Fiscal Policy to Fight Recession, Unemployment, and Inflation

Learning Objectives

By the end of this section, you will be able to:

- Explain how expansionary fiscal policy can shift aggregate demand and influence the economy
- Explain how contractionary fiscal policy can shift aggregate demand and influence the economy

Fiscal policy is the use of government spending and tax policy to influence the path of the economy over time. Graphically, we see that fiscal policy, whether through changes in spending or taxes, shifts the aggregate demand outward in the case of expansionary fiscal policy and inward in the case of contractionary fiscal policy. We know from the chapter on economic growth that over time the quantity and quality of our resources grow as the population and thus the labor force get larger, as businesses invest in new capital, and as technology improves. The result of this is regular shifts to the right of the aggregate supply curves, as Figure 17.10 illustrates.

The original equilibrium occurs at E_0, the intersection of aggregate demand curve AD_0 and aggregate supply curve $SRAS_0$, at an output level of 200 and a price level of 90. One year later, aggregate supply has shifted to the right to $SRAS_1$ 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 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 $SRAS_2$, 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.

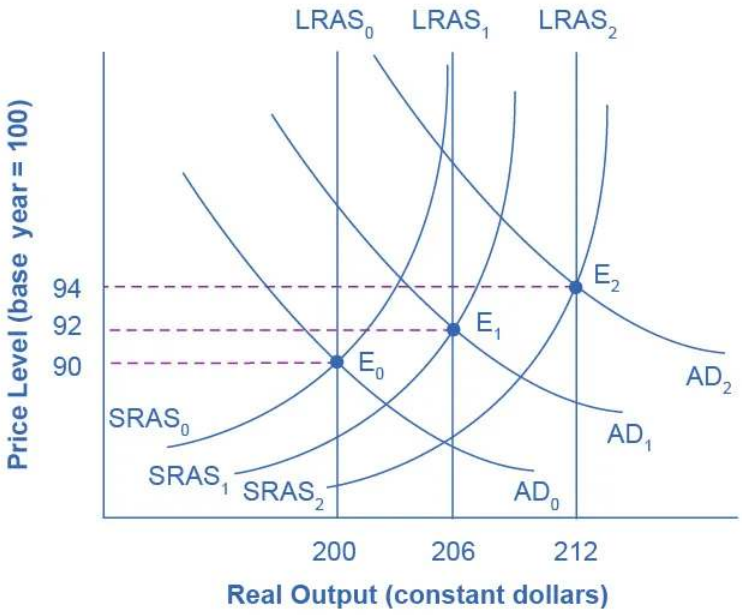


Figure 17.10 A Healthy, Growing Economy In this well-functioning economy, each year aggregate supply and aggregate demand shift to the right so that the economy proceeds from equilibrium E_0 to E_1 to E_2. Each year, the economy produces at potential GDP with only a small inflationary increase in the price level. However, if aggregate demand does not smoothly shift to the right and match increases in aggregate supply, growth with deflation can develop.

Aggregate demand and aggregate supply do not always move neatly together. Think about what causes shifts in aggregate demand over time. As aggregate supply increases, incomes tend to go up. This tends to increase consumer and investment spending, shifting the aggregate demand curve to the right, but in any given period it may not shift the same amount as aggregate supply. What happens to government spending and taxes? Government spends to pay for the ordinary business of government- items such as national defense, social security, and healthcare, as Figure 17.10 shows. Tax revenues, in part, pay for these expenditures. The

result may be an increase in aggregate demand more than or less than the increase in aggregate supply. Aggregate demand may fail to increase along with aggregate supply, or aggregate demand may even shift left, for 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, if shifts in aggregate demand run ahead of increases in aggregate supply, inflationary increases in the price level will result. Business cycles of recession and recovery 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.

Monetary Policy and Bank Regulation shows us that a central bank can use its powers over the banking system to engage in countercyclical—or "against the business cycle"—actions. If recession threatens, the central bank uses an expansionary monetary policy to increase the money supply, increase the quantity of loans, reduce interest rates, and shift aggregate demand to the right. If inflation threatens, the central bank uses contractionary monetary policy to reduce the money supply, reduce the quantity of loans, raise interest rates, and shift aggregate demand to the left. Fiscal policy is another macroeconomic policy tool for adjusting aggregate demand by using either government spending or taxation policy.

Expansionary Fiscal Policy

Expansionary fiscal policy increases the level of aggregate demand, through either increases in government spending or reductions in tax rates. Expansionary policy can do this by (1) increasing consumption by raising disposable income through cuts in personal income taxes or payroll taxes; (2) increasing investment spending by raising after-tax profits through cuts in business taxes; and (3) increasing government purchases through increased federal government spending 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 investment, 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 17.11, which is similar to the U.S. economy during the 2007-2009 recession. The intersection of aggregate demand (AD_0) and aggregate supply ($SRAS_0$) is occurring below the level of potential GDP as the LRAS curve indicates. At the equilibrium (E_0), a recession occurs and unemployment rises. 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.

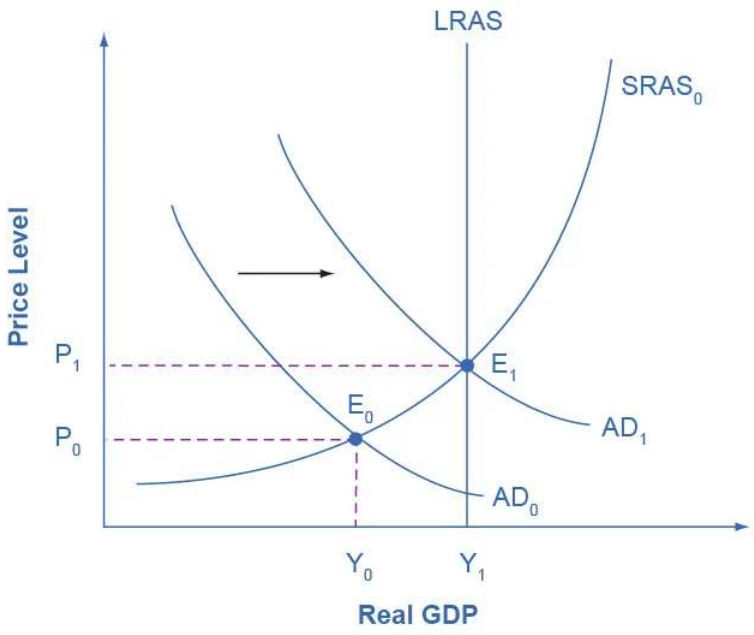


Figure 17.11 Expansionary Fiscal Policy The original equilibrium (E_0) represents a recession, occurring at a quantity of output (Y_0) below potential GDP. However, a shift of aggregate demand from AD_0 to AD_1, enacted through an expansionary fiscal policy, can move the economy to a new equilibrium output of E_1 at the level of potential GDP which the LRAS curve shows. 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? During the 2007-2009 Great Recession, the U.S. economy suffered a 3.1% cumulative loss of GDP. That may not sound like much, but it's more than one year's average growth rate of GDP. Over that time frame, the unemployment rate doubled from 5% to 10%. 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 the government implement expansionary fiscal policy through spending increases. In a bipartisan effort to address the extreme situation, the Obama administration and Congress passed an $830 billion expansionary policy in early 2009 involving both tax cuts and increases in government spending. At the same time, however, the federal stimulus was partially offset when state and local governments, whose budgets were hard hit by the recession, began cutting their spending.

Events were even more severe during the more recent pandemic-induced recession. In a single quarter (Quarter 2 of 2020), GDP fell by over 9%, or at an annualized rate of about 34%. Policymakers were quick to respond with expanded unemployment insurance, aid to state and local governments (so that they didn't have to cut their spending like they did during the Great Recession), grants and tax breaks for small businesses, and perhaps most significantly, stimulus checks sent to over 100 million households, totaling thousands of dollars each. Since these were mostly spending measures, they were supported more by Democrats than by Republicans, although both groups recognized the severity of the problem and were largely in agreement early on. Especially during the debates over later rounds of the stimulus checks, many discussions were had over the appropriate size and target of the checks. Ultimately, compromises were made and no side got exactly what it wanted.

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. However, advocates of smaller government, who seek to reduce taxes and government spending can use the AD AS model, as well as advocates of bigger government, who seek to raise taxes and government spending. Economic studies of specific taxing and spending programs can help inform decisions about whether the government should change taxes or spending, and in what ways. Ultimately, decisions about whether to use tax or spending mechanisms to implement macroeconomic policy is a political decision rather than a purely economic one.

Contractionary Fiscal Policy

Fiscal policy can also contribute to pushing aggregate demand beyond potential GDP in a way that leads to inflation. As Figure 17.12 shows, a very large budget deficit pushes up aggregate demand, so that the intersection of aggregate demand (AD_0) and aggregate supply ($SRAS_0$) occurs at equilibrium E_0, which is an output level above potential GDP. Economists sometimes call this an "overheating economy" where demand is so high that there is upward pressure on wages and prices, causing inflation. 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, where aggregate demand intersects the LRAS curve.

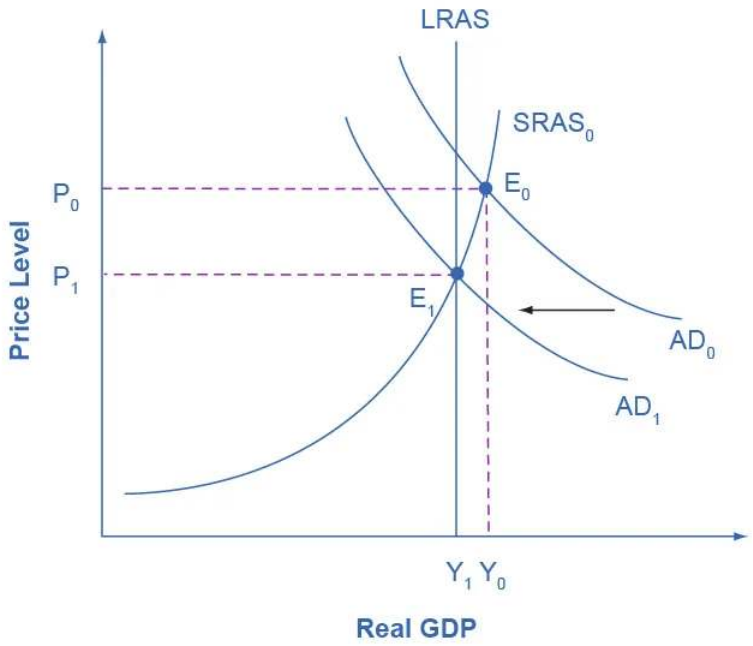


Figure 17.12 A Contractionary Fiscal Policy The economy starts at the equilibrium quantity of output Y_0, which is above potential GDP. The extremely high level of aggregate demand will generate inflationary increases in the price level. A contractionary fiscal policy can shift aggregate demand down from AD_0 to AD_1, leading to a new equilibrium output E_1, which occurs at potential GDP, where AD1 intersects the LRAS curve.

Again, the AD–AS model does not dictate how the government should carry out this contractionary fiscal policy. 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, the government needs to reduce aggregate demand.

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13.6: Automatic Stabilizers

Learning Objectives

By the end of this section, you will be able to:

- Describe how the federal government can use discretionary fiscal policy to stabilize the economy
- Identify examples of automatic stabilizers
- Understand how a government can use standardized employment budget to identify automatic stabilizers

In 2020, more than 20 million people could collect unemployment insurance benefits to replace some of their salaries. Federal fiscal policies include discretionary fiscal policy, when the government passes a new law that explicitly changes tax or spending levels. The 2020 stimulus checks and increases in state and local government aid are an example. Changes in tax and spending levels can also occur automatically, due to automatic stabilizers, such as unemployment insurance and food stamps, which are programs that are already laws that stimulate aggregate demand in a recession and hold down aggregate demand in a potentially inflationary boom.

Counterbalancing Recession and Boom

Consider first the situation where aggregate demand has risen sharply, causing the equilibrium to occur at a level of output above potential GDP. This situation will increase inflationary pressure in the economy. The policy prescription in this setting would be a dose of contractionary fiscal policy, implemented through some combination of higher taxes and lower spending. To some extent, *both* changes happen automatically. On the tax side, a rise in aggregate demand means that workers and firms throughout the economy earn more. Because taxes are based on personal income and corporate profits, a rise in aggregate demand automatically increases tax payments. On the spending side, stronger aggregate demand typically means lower unemployment and fewer layoffs, and so there is less need for government spending on unemployment benefits, welfare, Medicaid, and other programs in the social safety net.

The process works in reverse, too. If aggregate demand were to fall sharply so that a recession occurs, then the prescription would be for expansionary fiscal policy—some mix of tax cuts and spending increases. The lower level of aggregate demand and higher unemployment will tend to pull down personal incomes and corporate profits, an effect that will reduce the amount of taxes owed automatically. Higher unemployment and a weaker economy should lead to increased government spending on unemployment benefits, welfare, and other similar domestic programs. In 2009, the stimulus package included an extension in the time allowed to collect unemployment insurance. In addition, the automatic stabilizers react to a weakening of aggregate demand with expansionary fiscal policy and react to a strengthening of aggregate demand with contractionary fiscal policy, just as the AD/AS analysis suggests.

A combination of automatic stabilizers and discretionary fiscal policy produced the very large budget deficit in 2020. The pandemic caused high levels of unemployment, meaning less tax-generating economic activity. The high unemployment rate triggered the automatic stabilizers that reduce taxes and increase spending, due to the increased amount of unemployment insurance paid out by the federal and state governments. 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.

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 (as we discussed in Unemployment). 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.

The Standardized Employment Deficit or Surplus

Each year, the nonpartisan Congressional Budget Office (CBO) calculates the standardized employment budget—that is, what the budget deficit or surplus would be if the economy were producing at potential GDP, where people who look for work were finding jobs in a reasonable period of time and businesses were making normal profits, with the result that both workers and businesses would be earning more and paying more taxes. In effect, the standardized employment deficit eliminates the impact of the automatic stabilizers. Figure 17.13 compares the actual budget deficits of recent decades with the CBO's standardized deficit.

Link It Up

Visit this website to learn more from the Congressional Budget Office.

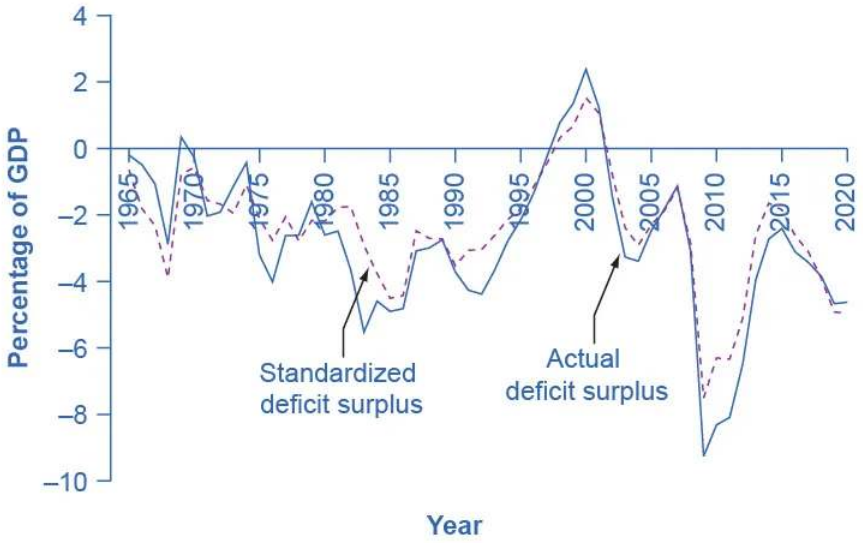


Figure 17.13 Comparison of Actual Budget Deficits with the Standardized Employment Deficit When the economy is in recession, the standardized employment budget deficit is less than the actual budget deficit because the economy is below potential GDP, and the automatic stabilizers are reducing taxes and 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*, https://www.cbo.gov/data/budget-economic-data#8)

Notice that in recession years, like the early 1990s, 2001, or 2009, the standardized employment deficit is smaller than the actual deficit. (These data are only available up until February 2020, so they do not include the effects of the pandemic.) 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 occur 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.

Child Tax Credit

One new form of government spending meant to support working families is an expanded Child Tax Credit (CTC). Under changes which took effect in 2021, qualifying families will receive the credit as a monthly payment directly into their bank accounts. The credit is also an expanded amount: from $2,000 per child to $3,600 per child under the age of 6 (less for children older than that).

Introduced by President Joe Biden's American Rescue Plan, it is hoped that the newly expanded CTC will help reduce child poverty and support families. Because the CTC works like a grant that is automatically extended to households, the CTC is considered a new kind of fiscal policy that is related to a universal basic income policy which some have argued for in the past. By sending money out monthly instead of a lump sum as part of a person's tax refund, the intention is to help families better manage monthly bills for things like clothes and food.

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13.7: Practical Problems with Discretionary Fiscal Policy

Learning Objectives

By the end of this section, you will be able to:

- Understand how fiscal policy and monetary policy are interconnected
- Explain the three lag times that often occur when solving economic problems
- Identify the legal and political challenges of responding to an economic problem

In the early 1960s, many leading economists believed that the problem of the business cycle, and the swings between cyclical unemployment and inflation, were a thing of the past. On the cover of its December 31, 1965, issue, *Time* magazine, then the premier news magazine in the United States, ran a picture of John Maynard Keynes, and the story inside identified Keynesian theories as "the prime influence on the world's economies." The article reported that policymakers have "used Keynesian principles not only to avoid the violent [business] cycles of prewar days but to produce phenomenal economic growth and to achieve remarkably stable prices."

This happy consensus, however, did not last. The U.S. economy suffered one recession from December 1969 to November 1970, a deeper recession from November 1973 to March 1975, and then double-dip recessions from January to June 1980 and from July 1981 to November 1982. At various times, inflation and unemployment both soared. Clearly, the problems of macroeconomic policy had not been completely solved. As economists began to consider what had gone wrong, they identified a number of issues that make discretionary fiscal policy more difficult than it had seemed in the rosy optimism of the mid-1960s.

Fiscal Policy and Interest Rates

Because fiscal policy affects the quantity that the government borrows in financial capital markets, it not only affects aggregate demand—it can also affect interest rates. In Figure 17.14, the original equilibrium (E_0) in the financial capital market occurs at a quantity of $800 billion and an interest rate of 6%. However, an increase in government budget deficits shifts the demand for financial capital from D_0 to D_1. The new equilibrium (E_1) occurs at a quantity of $900 billion and an interest rate of 7%.

A consensus estimate based on a number of studies is that an increase in budget deficits (or a fall in budget surplus) by 1% of GDP will cause an increase of 0.5–1.0% in the long-term interest rate.

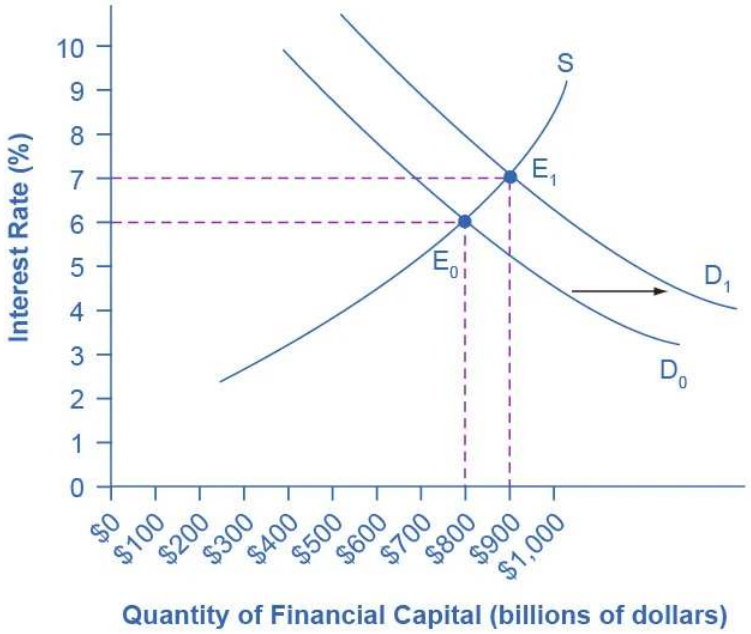


Figure 17.14 Fiscal Policy and Interest Rates When a government borrows money in the financial capital market, it causes a shift in the demand for financial capital from D_0 to D_1. As the equilibrium moves from E_0 to E_1, the equilibrium interest rate rises from 6% to 7% in this example. In this way, an expansionary fiscal policy intended to shift aggregate demand to the right can also lead to a higher interest rate, which has the effect of shifting aggregate demand back to the left.

A problem arises here. An expansionary fiscal policy, with tax cuts or spending increases, is intended to increase aggregate demand. If an expansionary fiscal policy also causes higher interest rates, then firms and households are discouraged from borrowing and spending (as occurs with tight monetary policy), thus reducing aggregate demand. Even if the direct effect of expansionary fiscal policy on increasing demand is not totally offset by lower aggregate demand from higher interest rates, fiscal policy can end up less powerful than was originally expected. We refer to this as crowding out, where government borrowing and spending results in higher interest rates, which reduces business investment and household consumption.

The broader lesson is that the government must coordinate fiscal and monetary policy. If expansionary fiscal policy is to work well, then the central bank can also reduce or keep short-term interest rates low. Conversely, monetary policy can also help to ensure that contractionary fiscal policy does not lead to a recession.

Long and Variable Time Lags

The government can change monetary policy several times each year, but it takes much longer to enact fiscal policy. Imagine that the economy starts to slow down. It often takes some months before the economic statistics signal clearly that a downturn has started, and a few months more to confirm that it is truly a recession and not just a one- or two-month blip. Economists often call the time it takes to determine that a recession has occurred the recognition lag. After this lag, policymakers become aware of the problem and propose fiscal policy bills. The bills go 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 often refer to the time it takes to pass a bill as the legislative lag. Finally, once the government passes the bill it takes some time to disperse the funds to the appropriate agencies to implement the programs. Economists call the time it takes to start the projects the implementation lag.

Moreover, 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. During the early days of the Obama administration, for example, no one knew the true extent of the economy's deficit. During the 2008-2009 financial crisis, the rapid collapse of the banking system and automotive sector made it difficult to assess how quickly the economy was collapsing.

Thus, it can take many months or even more than a year to begin an expansionary fiscal policy after a recession has started—and even then, uncertainty will remain over exactly how much to expand or contract taxes and spending. When politicians attempt to use countercyclical fiscal policy to fight recession or inflation, they run the risk of responding to the macroeconomic situation of two or three years ago, in a way that may be exactly wrong for the economy at that time. George P. Schultz, a professor of economics, former Secretary of the Treasury, and Director of the Office of Management and Budget, once wrote: "While the economist is accustomed to the concept of lags, the politician likes instant results. The tension comes because, as I have seen on many occasions, the economist's lag is the politician's nightmare."

Temporary and Permanent Fiscal Policy

A temporary tax cut or spending increase will explicitly last only for a year or two, and then revert 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. However, 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 to its exact earlier shape. Instead, the economy's internal structure evolves and changes and this process can take time. For example, much of the economic growth of the mid-2000s was in the construction sector (especially of housing) and finance. However, when housing prices started falling in 2007 and the resulting financial crunch led into recession (as we discussed in Monetary Policy and Bank Regulation), 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 who lost work from these sectors in the 2008-2009 Great Recession 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 Clear It Up feature shows. 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.

Clear It Up

Why do jobs vanish?

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 job loss, 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 Fiscal Policy

Fiscal 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. However, fiscal 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.

Link It Up

Visit this website to read about how fiscal policies are affecting the recovery.

Political Realties 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. Some politicians 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, it is time for the government to stimulate the economy, raising spending, and cutting taxes. This offsets the drop in the economy in the other sectors. 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. However, 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.

Discretionary Fiscal Policy: Summing Up

Expansionary fiscal 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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13.8: The Question of a Balanced Budget

Learning Objectives

By the end of this section, you will be able to:

- Understand the arguments for and against requiring the U.S. federal budget to be balanced
- Consider the long-run and short-run effects of a federal budget deficit

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.)

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.

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. The Impacts of Government Borrowing 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.

Bring It Home

No Yellowstone Park?

The 2013 federal budget shutdown illustrated the many sides to fiscal policy and the federal budget. In 2013, Republicans and Democrats could not agree on which spending policies to fund and how large the government debt should be. Due to the severity of the 2008-2009 recession, the fiscal stimulus, and previous policies, the federal budget deficit and debt was historically high. One way to try to cut federal spending and borrowing was to refuse to raise the legal federal debt limit, or tie on conditions to appropriation bills to stop the Affordable Health Care Act. This disagreement led to a two-week federal government shutdown and got close to the deadline where the federal government would default on its Treasury bonds. Finally,

> however, a compromise emerged and the government avoided default. This shows clearly how closely fiscal policies are tied to politics.

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13.9: Key Terms

automatic stabilizers
tax and spending rules that have the effect of slowing down the rate of decrease in aggregate demand when the economy slows down and restraining aggregate demand when the economy speeds up, without any additional change in legislation

balanced budget
when government spending and taxes are equal

budget deficit
when the federal government spends more money than it receives in taxes in a given year

budget surplus
when the government receives more money in taxes than it spends in a year

contractionary fiscal policy
fiscal policy that decreases the level of aggregate demand, either through cuts in government spending or increases in taxes

corporate income tax
a tax imposed on corporate profits

crowding out
federal spending and borrowing causes interest rates to rise and business investment to fall

discretionary fiscal policy
the government passes a new law that explicitly changes overall tax or spending levels with the intent of influencing the level of overall economic activity

estate and gift tax
a tax on people who pass assets to the next generation—either after death or during life in the form of gifts

excise tax
a tax on a specific good—on gasoline, tobacco, and alcohol

expansionary fiscal policy
fiscal policy that increases the level of aggregate demand, either through increases in government spending or cuts in taxes

implementation lag
the time it takes for the funds relating to fiscal policy to be dispersed to the appropriate agencies to implement the programs

individual income tax
a tax based on the income, of all forms, received by individuals

legislative lag
the time it takes to get a fiscal policy bill passed

marginal tax rates
or the tax that must be paid on all yearly income

national debt
the total accumulated amount the government has borrowed, over time, and not yet paid back

payroll tax

a tax based on the pay received from employers; the taxes provide funds for Social Security and Medicare

progressive tax

a tax that collects a greater share of income from those with high incomes than from those with lower incomes

proportional tax

a tax that is a flat percentage of income earned, regardless of level of income

recognition lag

the time it takes to determine that a recession has occurred

regressive tax

a tax in which people with higher incomes pay a smaller share of their income in tax

standardized employment budget

the budget deficit or surplus in any given year adjusted for what it would have been if the economy were producing at potential GDP

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13.10: Key Concepts and Summary

17.1 Government Spending

Fiscal policy is the set of policies that relate to federal government spending, taxation, and borrowing. In recent decades, the level of federal government spending and taxes, expressed as a share of GDP, has not changed much, typically fluctuating between about 18% to 22% of GDP. However, the level of state spending and taxes, as a share of GDP, has risen from about 12–13% to about 20% of GDP over the last four decades. The four main areas of federal spending are national defense, Social Security, healthcare, and interest payments, which together account for about 70% of all federal spending. When a government spends more than it collects in taxes, it is said to have a budget deficit. When a government collects more in taxes than it spends, it is said to have a budget surplus. If government spending and taxes are equal, it is said to have a balanced budget. The sum of all past deficits and surpluses make up the government debt.

17.2 Taxation

The two main federal taxes are individual income taxes and payroll taxes that provide funds for Social Security and Medicare; these taxes together account for more than 80% of federal revenues. Other federal taxes include the corporate income tax, excise taxes on alcohol, gasoline and tobacco, and the estate and gift tax. A progressive tax is one, like the federal income tax, where those with higher incomes pay a higher share of taxes out of their income than those with lower incomes. A proportional tax is one, like the payroll tax for Medicare, where everyone pays the same share of taxes regardless of income level. A regressive tax is one, like the payroll tax (above a certain threshold) that supports Social Security, where those with high income pay a lower share of income in taxes than those with lower incomes.

17.3 Federal Deficits and the National Debt

For most of the twentieth century, the U.S. government took on debt during wartime and then paid down that debt slowly in peacetime. However, it took on quite substantial debts in peacetime in the 1980s and early 1990s, before a brief period of budget surpluses from 1998 to 2001, followed by a return to annual budget deficits since 2002, with very large deficits in the recession of 2008 and 2009. A budget deficit or budget surplus is measured annually. Total government debt or national debt is the sum of budget deficits and budget surpluses over time.

17.4 Using Fiscal Policy to Fight Recession, Unemployment, and Inflation

Expansionary fiscal policy increases the level of aggregate demand, either through increases in government spending or through reductions in taxes. Expansionary fiscal policy is most appropriate when an economy is in recession and producing below its potential GDP. Contractionary fiscal policy decreases the level of aggregate demand, either through cuts in government spending or increases in taxes. Contractionary fiscal policy is most appropriate when an economy is producing above its potential GDP.

17.5 Automatic Stabilizers

Fiscal policy is conducted both through discretionary fiscal policy, which occurs when the government enacts taxation or spending changes in response to economic events, or through automatic stabilizers, which are taxing and spending mechanisms that, by their design, shift in response to economic events without any further legislation. The standardized employment budget is the calculation of what the budget deficit or budget surplus would have been in a given year if the economy had been producing at its potential GDP in that year. Many economists and politicians criticize the use of fiscal policy for a variety of reasons, including concerns over time lags, the impact on interest rates, and the inherently political nature of fiscal policy. We cover the critique of fiscal policy in the next module.

17.6 Practical Problems with Discretionary Fiscal Policy

Because fiscal policy affects the quantity of money that the government borrows in financial capital markets, it not only affects aggregate demand—it can also affect interest rates. If an expansionary fiscal policy also causes higher interest rates, then firms and households are discouraged from borrowing and spending, reducing aggregate demand in a situation called crowding out. Given the uncertainties over interest rate effects, time lags (implementation lag, legislative lag, and recognition lag), temporary and permanent policies, and unpredictable political behavior, many economists and knowledgeable policymakers have concluded that discretionary fiscal policy is a blunt instrument and better used only in extreme situations.

17.7 The Question of a Balanced Budget

Balanced budget amendments are a popular political idea, but the economic merits behind such proposals are questionable. Most economists accept that fiscal policy needs to be flexible enough to accommodate unforeseen expenditures, such as wars or recessions. While persistent, large budget deficits can indeed be a problem, a balanced budget amendment prevents even small, temporary deficits that might, in some cases, be necessary.

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CHAPTER OVERVIEW

14: The Aggregate Demand/Aggregate Supply Model

14.1: Introduction to the Aggregate Demand/Aggregate Supply Model
14.2: Macroeconomic Perspectives on Demand and Supply
14.3: Building a Model of Aggregate Demand and Aggregate Supply
14.4: Shifts in Aggregate Supply
14.5: Shifts in Aggregate Demand
14.6: How the AD/AS Model Incorporates Growth, Unemployment, and Inflation
14.7: Keynes' Law and Say's Law in the AD/AS Model
14.8: Key Terms
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14.1: Introduction to the Aggregate Demand/Aggregate Supply Model



Figure 11.1 New Home Construction 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 "our house! Again!" by Tim Pierce/Flickr Creative Commons, CC BY 2.0)

Chapter Objectives

In this chapter, you will learn about:

- Macroeconomic Perspectives on Demand and Supply
- Building a Model of Aggregate Supply and Aggregate Demand
- Shifts in Aggregate Supply
- Shifts in Aggregate Demand
- How the AS–AD Model Incorporates Growth, Unemployment, and Inflation
- Keynes' Law and Say's Law in the AS–AD Model

Bring It Home

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 11.2 shows how new single family home sales peaked in 2005 at 1,279,000 units.

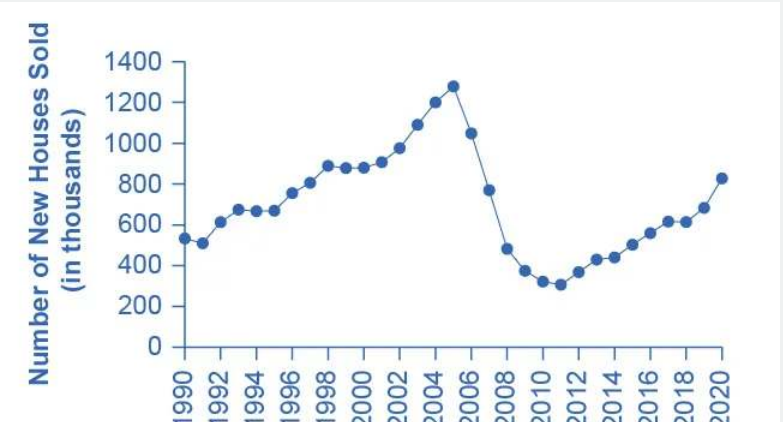


Figure 11.2 New Single Family Houses Sold From the early 1990s up through 2005, the number of new single family houses sold rose steadily. In 2006, the number dropped dramatically and this dramatic decline continued through 2011. Beginning in 2012, the number of new houses sold began to climb back up. (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.

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. 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 implementing aggressive fiscal and monetary policy.

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 that occurred during the Great Depression in the 1930s which lasted several years. Why does the economy grow at different rates in different years? What are the causes of the cyclical behavior of the economy? This chapter will introduce an important model, the aggregate demand–aggregate supply model, to begin our understanding of why economies expand and contract over time.

Click to view content

New One-Family Houses Sold in the United States.

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. The next three chapters take up this task.

This chapter introduces the macroeconomic model of aggregate supply and aggregate demand, how the two interact to reach a macroeconomic equilibrium, and how shifts in aggregate demand or aggregate supply will affect that equilibrium. This chapter also relates the model of aggregate supply and aggregate demand to the three goals of economic policy (growth, unemployment, and inflation), and provides a framework for thinking about many of the connections and tradeoffs between these goals. The chapter on The Keynesian Perspective focuses on the macroeconomy in the short run, where aggregate demand plays a crucial role. The chapter on The Neoclassical Perspective explores the macroeconomy in the long run, where aggregate supply plays a crucial role.

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14.2: Macroeconomic Perspectives on Demand and Supply

Learning Objectives

By the end of this section, you will be able to:

- Explain Say's Law and understand why it primarily applies in the long run
- Explain Keynes' Law and understand why it primarily applies in the short run

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

Those economists who emphasize the role of supply in the macroeconomy often refer to the work of a famous early nineteenth century French economist named Jean-Baptiste Say (1767–1832). Say's law is: "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 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. We alluded to this earlier in our discussion of the National Income approach to measuring GDP. 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.

Keynes' Law and the Macroeconomics of Demand

The alternative to Say's law, with its emphasis on supply, is 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.

When Keynes wrote his influential work *The General Theory of Employment, Interest, and Money* during the 1930s Great Depression, he pointed out that during the Depression, the economy's capacity 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 closed, 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.

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. We need to take into account both supply and demand. 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.

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14.3: Building a Model of Aggregate Demand and Aggregate Supply

Learning Objectives

By the end of this section, you will be able to:

- Explain the aggregate supply curve and how it relates to real GDP and potential GDP
- Explain the aggregate demand curve and how it is influenced by price levels
- Interpret the aggregate demand/aggregate supply model
- Identify the point of equilibrium in the aggregate demand/aggregate supply model
- Define short run aggregate supply and long run aggregate supply

To build a useful macroeconomic model, we need a model that shows what determines total supply or total demand for the economy, and how total demand and total supply interact at the macroeconomic level. We call this the aggregate demand/aggregate supply model. This module will explain aggregate supply, aggregate demand, and the equilibrium between them. The following modules will discuss the causes of shifts in aggregate supply and aggregate demand.

The Aggregate Supply Curve and Potential GDP

Firms make decisions about what quantity to supply based on the profits they expect to earn. They determine profits, in turn, by the price of the outputs they sell and by the prices of the inputs, like labor or raw materials, that they need to buy. Aggregate supply (AS) refers to the total quantity of output (i.e. real GDP) firms will produce and sell. The aggregate supply (AS) curve shows the total quantity of output (i.e. real GDP) that firms will produce and sell at each price level.

Figure 11.3 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.

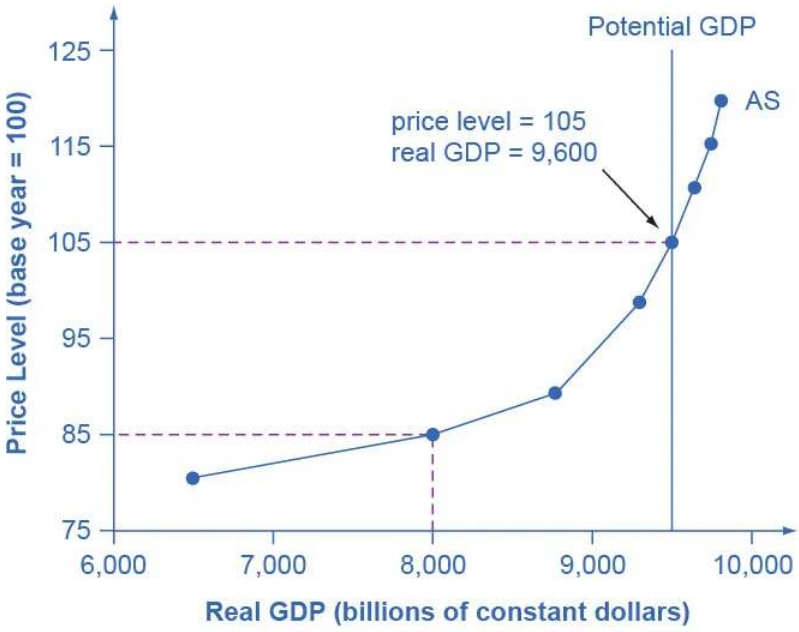


Figure 11.3 The Aggregate Supply Curve Aggregate supply (AS) slopes up, because as the price level for outputs rises, with the price of inputs remaining fixed, firms have an incentive to produce more to earn higher profits. The potential GDP line shows the maximum that the economy can produce with full employment of workers and physical capital.

The diagram's horizontal axis shows real GDP—that is, the level of GDP adjusted for inflation. The vertical axis shows the price level, which measures the average price of all goods and services produced in the economy. In other words, the price level in the AD-AS model is what we called the GDP Deflator in The Macroeconomic Perspective. Remember that the price level is different

from the inflation rate. Visualize the price level as an index number, like the Consumer Price Index, while the inflation rate is the percentage change in the price level over time.

As the price level rises, real GDP rises as well. Why? The price level on the vertical axis represents prices for final goods or outputs bought in the economy—i.e. the GDP deflator—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 final 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. In other words, an aggregate supply curve shows how producers as a group will respond to an increase in aggregate demand.

An AS curve's slope 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 we define as the amount of real GDP an economy can produce by fully employing its existing levels 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 assuming no rise in input prices—can encourage a considerable surge in the quantity of aggregate supply because so many workers and factories are ready to swing into production.

As the GDP increases, however, some 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 AS curve's intermediate area, 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 real GDP in response to a given rise in the price level will not be as large. (Read the following Clear It Up feature to learn why the AS curve crosses potential GDP.)

Clear It Up

Why does AS cross potential GDP?

Economists typically draw the aggregate supply curve 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 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.

The Aggregate Demand Curve

Aggregate demand (AD) refers to the amount of total spending on domestic goods and services in an economy. (Strictly speaking, AD is what economists call total planned expenditure. We will further explain this distinction in the appendix The Expenditure-Output Model . For now, just think of aggregate demand as total spending.) It includes all four components of demand: consumption, investment, government spending, and net exports (exports minus imports). This demand is determined by a number of factors, but one of them is the price level—recall though, that the price level is an index number such as the GDP deflator that measures the average price of the things we buy. The aggregate demand (AD) curve shows the total spending on domestic goods and services at each price level.

Figure 11.4 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 slopes down, which means that increases in the price level of outputs lead to a lower quantity of total spending. The reasons behind this shape are related to how changes in the price level affect the different

components of aggregate demand. The following components comprise aggregate demand: consumption spending (C), investment spending (I), government spending (G), and spending on exports (X) minus imports (M): C + I + G + X – M.

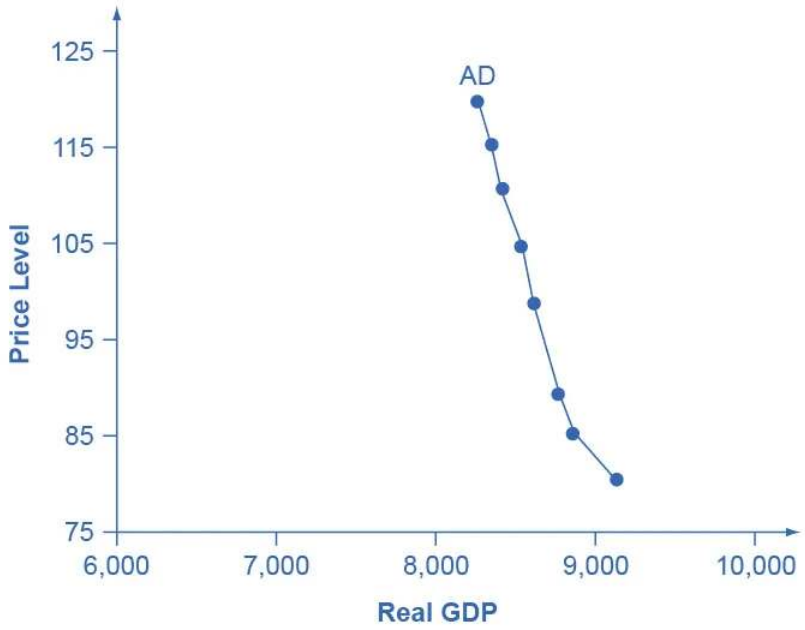


Figure 11.4 The Aggregate Demand Curve Aggregate demand (AD) slopes down, showing that, as the price level rises, the amount of total spending on domestic goods and services declines.

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.

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 11.4 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.

Read the following Work It Out feature to learn how to interpret the AD/AS model. In this example, aggregate supply, aggregate demand, and the price level are given for the imaginary country of Xurbia.

Work It Out

Interpreting the AD/AS Model

Table 11.1 shows information on aggregate supply, aggregate demand, and the price level for the imaginary country of Xurbia. What information does Table 11.1 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?

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

Table 11.1 Price Level: Aggregate Demand/Aggregate Supply

To begin to use the AD/AS 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 11.5 which provides a visual to aid in your analysis.

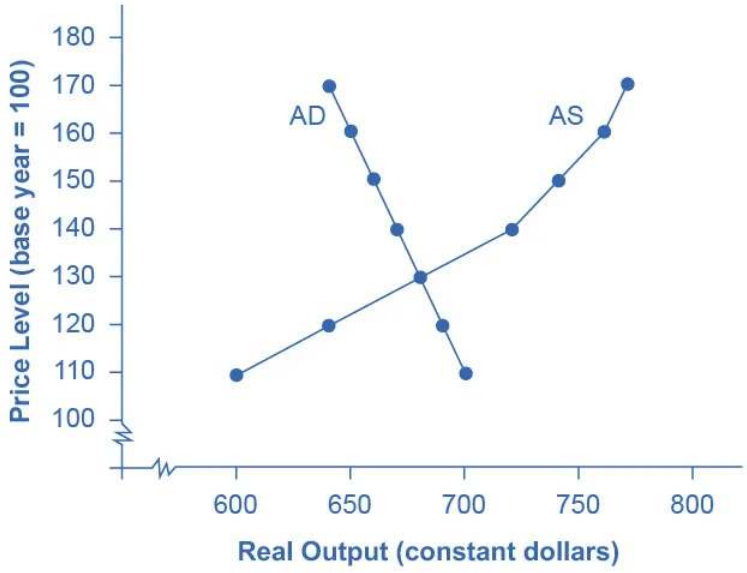


Figure 11.5 The AD/AS Curves AD and AS curves created from the data in Table 11.1.

Step 5. Determine where AD and AS intersect. This is the equilibrium with 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.

Equilibrium in the Aggregate Demand/Aggregate Supply Model

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. At a relatively low price level for output, firms have little incentive to produce, although consumers would be willing to purchase a large quantity of output. As the price level rises, aggregate supply rises and aggregate demand falls until the equilibrium point is reached.

Figure 11.6 combines the AS curve from Figure 11.3 and the AD curve from Figure 11.4 and places them both on a single diagram. In this example, the equilibrium point occurs at point E, at a price level of 90 and an output level of 8,800.

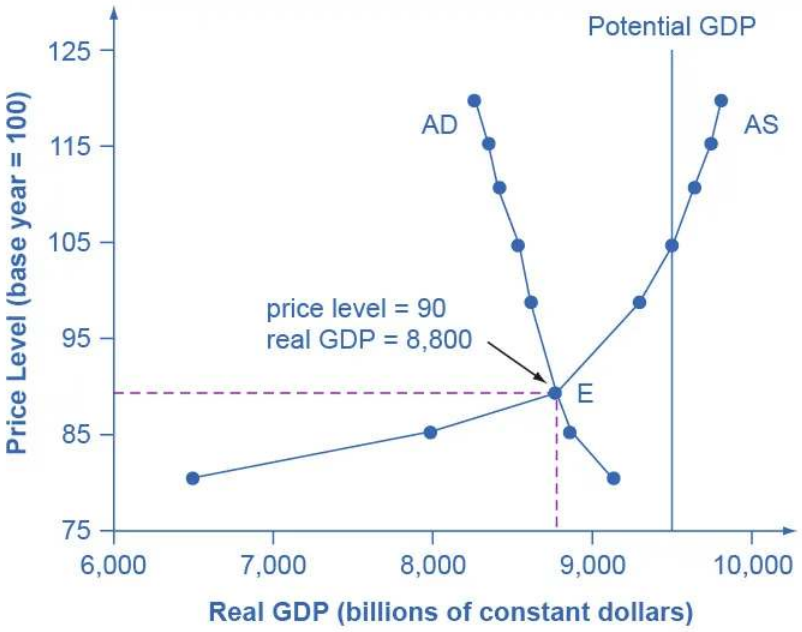


Figure 11.6 Aggregate Supply and Aggregate Demand The equilibrium, where aggregate supply (AS) equals aggregate demand (AD), occurs at a price level of 90 and an output level of 8,800.

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. Read the following Clear It Up feature to gain an understanding of whether AS and AD are macro or micro.

Clear It Up

Are AS and AD macro or micro?

These aggregate supply and demand models 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 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 AD/AS 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.

Defining SRAS and LRAS

In the Clear It Up feature titled “Why does AS cross potential GDP?” we differentiated between short run changes in aggregate supply which the AS curve shows and long run changes in aggregate supply which the vertical line at potential GDP defines. In the short run, if demand is too low (or too high), it is possible for producers to supply less GDP (or more GDP) than potential. In the long run, however, producers are limited to producing at potential GDP. For this reason, we may also refer to what we have been calling the AS curve as the short run aggregate supply (SRAS) curve. We may also refer to the vertical line at potential GDP as the long run aggregate supply (LRAS) curve.

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14.4: Shifts in Aggregate Supply

Learning Objectives

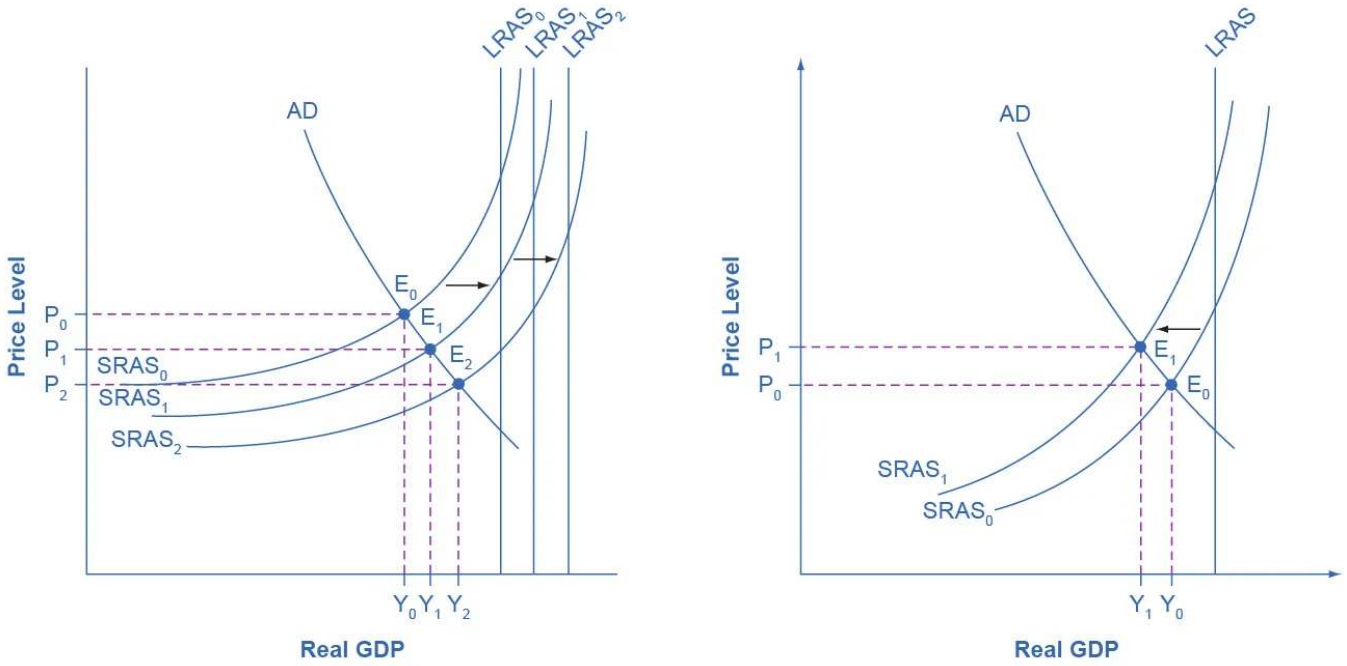
By the end of this section, you will be able to:

- Explain how productivity growth changes the aggregate supply curve
- Explain how changes in input prices change the aggregate supply curve

The original equilibrium in the AD/AS diagram will shift to a new equilibrium if the AS or AD curve shifts. When the aggregate supply curve shifts to the right, then at every price level, producers supply a greater quantity of real GDP. When the AS curve shifts to the left, then at every price level, producers supply a lower quantity of real GDP. This module discusses two of the most important factors that can lead to shifts in the AS curve: productivity growth and changes in input prices.

How Productivity Growth Shifts the AS Curve

In the long run, the most important factor shifting the AS curve is productivity growth. Productivity means how much output can be produced with a given quantity of labor. One measure of this is output per worker or GDP per capita. Over time, productivity grows so that the same quantity of labor can produce more output. Historically, the real growth in GDP per capita in an advanced economy like the United States has averaged about 2% to 3% per year, but productivity growth has been faster during certain extended periods like the 1960s and the late 1990s through the early 2000s, or slower during periods like the 1970s. A higher level of productivity shifts the AS curve to the right, because with improved productivity, firms can produce a greater quantity of output at every price level. Figure 11.7 (a) shows an outward shift in productivity over two time periods. The AS curve shifts out from $SRAS_0$ to $SRAS_1$ to $SRAS_2$, and the equilibrium shifts from E_0 to E_1 to E_2. Note that with increased productivity, workers can produce more GDP. Thus, full employment corresponds to a higher level of potential GDP, which we show as a rightward shift in LRAS from $LRAS_0$ to $LRAS_1$ to $LRAS_2$.



(a) Productivity growth shifts AS to the right

(b) Higher prices for key inputs shifts AS to the left

Figure 11.7 Shifts in Aggregate Supply (a) The rise in productivity causes the SRAS curve to shift to the right. The original equilibrium E_0 is at the intersection of AD and $SRAS_0$. When SRAS shifts right, then the new equilibrium E_1 is at the intersection of AD and $SRAS_1$, and then yet another equilibrium, E_2, is at the intersection of AD and $SRAS_2$. Shifts in SRAS to the right, lead to a greater level of output and to downward pressure on the price level. (b) A higher price for inputs means that at any given price

level for outputs, a lower real GDP will be produced so aggregate supply will shift to the left from $SRAS_0$ to $SRAS_1$. The new equilibrium, E_1, has a reduced quantity of output and a higher price level than the original equilibrium (E_0).

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, if this shift in SRAS results from gains in productivity growth, which we typically measure in terms of a few percentage points per year, the effect will be relatively small over a few months or even a couple of years. Recall how in Choice in a World of Scarcity, we said that a nation's production possibilities frontier is fixed in the short run, but shifts out in the long run? This is the same phenomenon using a different model.

How Changes in Input Prices Shift the AS Curve

Higher prices for inputs that are widely used across the entire economy can have a macroeconomic impact on aggregate supply. Examples of such widely used inputs include labor and energy products. Increases in the price of such inputs will cause the SRAS curve to shift to the left, which 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. Figure 11.7 (b) 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, 1980–1982, 1990–91, 2001, and 2007–2009 that were each preceded or accompanied by a rise in the key input of oil prices. In the 1970s, this pattern of a shift to the left in SRAS leading to a stagnant economy with high unemployment and inflation was nicknamed stagflation.

Conversely, a decline in the price of a key input like oil will shift 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 oil price led to a situation like that which we presented earlier in Figure 11.7 (a), where the outward shift of SRAS to the right allowed the economy to expand, unemployment to fall, and inflation to decline.

Along with energy prices, two other key inputs that may shift the SRAS curve are the cost of labor, or wages, and the cost of imported goods that we use as inputs for other 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. Note that, unlike changes in productivity, changes in input prices do not generally cause LRAS to shift, only SRAS.

Other Supply Shocks

The aggregate supply curve can also shift due to shocks to input goods or labor. For example, 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.

Similarly, shocks to the labor market can affect aggregate supply. An extreme example might be an overseas war that required a large number of workers to cease their ordinary production in order to go fight for their country. In this case, SRAS and LRAS would both shift to the left because there would be fewer workers available to produce goods at any given price.

Another example in this vein is a pandemic, like the COVID-19 pandemic. A pandemic causes many workers to become sick, temporarily reducing the supply of workers by a large amount. Further, workers might be cautious to go back to work in a pandemic because of health or safety concerns. While the shock to labor supply might not be permanent, it can cause a reduction in the supply of many goods and services, reflected in a leftward shift in the short-run aggregate supply curve. At various points during the COVID-19-induced pandemic, computer chips for automobiles, meat, and other consumer services were in short supply because of worker shortages around the world.

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14.5: Shifts in Aggregate Demand

Learning Objectives

By the end of this section, you will be able to:

- Explain how imports influence aggregate demand
- Identify ways in which business confidence and consumer confidence can affect aggregate demand
- Explain how government policy can change aggregate demand
- Evaluate why economists disagree on the topic of tax cuts

As we 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). (Read the following Clear It Up feature for explanation of why imports are subtracted from exports and what this means for aggregate demand.) 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. 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. The Keynesian Perspective will discuss the components of aggregate demand and the factors that affect them. Here, the discussion will sketch two broad categories that could cause AD curves to shift: changes in consumer or firm behavior and changes in government tax or spending policy.

Clear It Up

Do imports diminish aggregate demand?

We have seen that the formula for aggregate demand is AD = C + I + G + X - M, where M is the total value of imported 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? The short answer is yes, because aggregate demand is defined as total demand for domestically produced goods and services.

When an American buys a foreign product, for example, it gets counted along with all the other consumption. Thus, 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 are subtracted back out in the M term of the equation.

Because of the way in which we write the demand equation, 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 or G term, 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 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. During the 2010s, confidence has climbed from a 2011 low of 55.8 back to a level in the upper 90s, before falling to the lower 70s in 2020 due to the COIVD-19 pandemic, which economists consider close to a healthy state.

The Organization for Economic Development and Cooperation (OECD) publishes one measure of business confidence: the "business tendency surveys". The OECD collects business opinion survey data for 21 countries on future selling prices and employment, among other business climate elements. After sharply declining during the Great Recession, the measure has risen above zero again and is back to long-term averages (the indicator dips below zero when business outlook is weaker than usual). Of course, either of these survey measures is not 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 economists associate a rise in confidence 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 Figure 11.8 (a) shows.

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. Figure 11.8 (b) shows 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.

Link It Up

Visit this website for data on consumer confidence.

Link It Up

Visit this website for data on business confidence.

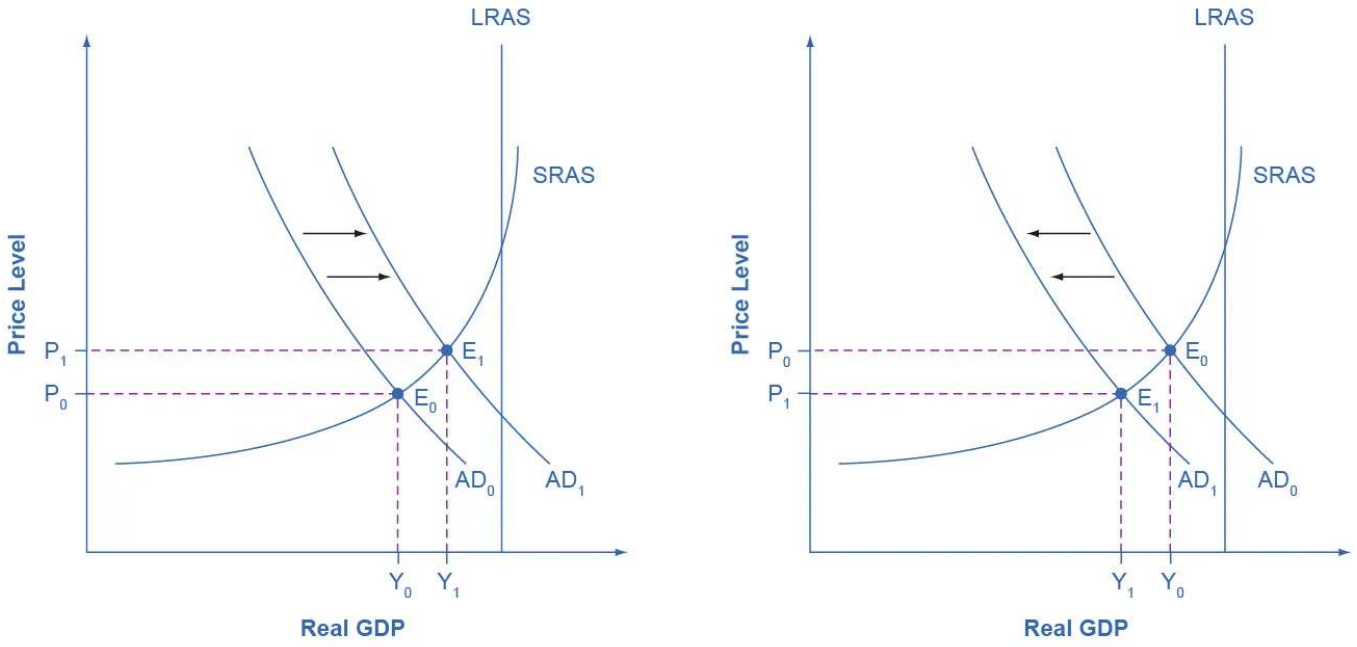


Figure 11.8 Shifts in Aggregate Demand (a) An increase in consumer confidence or business confidence can shift AD to the right, from AD_0 to AD_1. When AD shifts to the right, the new equilibrium (E_1) will have a higher quantity of output and also a higher price level compared with the original equilibrium (E_0). In this example, the new equilibrium (E_1) is also closer to potential GDP. An increase in government spending or a cut in taxes that leads to a rise in consumer spending can also shift AD to the right. (b) 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.

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 11.8 (a), while lower government spending will cause AD to shift to the left, as in Figure 11.8 (b). For example, in the United States, government spending declined by 3.2% of GDP during the 1990s, from 21% of GDP in 1991, and to 17.8% of GDP in 1998. However, from 2005 to 2009, the peak of the Great Recession, government spending increased from 19% of GDP to 21.4% of GDP. If changes of a few percentage points of GDP seem small to you, remember that since GDP was about $14.4 trillion in 2009, a seemingly small change of 2% of GDP is equal to close to $300 billion. Since 2009, government expenditures have gone back down to around 17–18% of GDP, although in 2020 they rose to 18.5%.

Tax policy can affect consumption and investment spending, too. Tax cuts for individuals will tend to increase consumption demand, while tax increases 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 2001 recession, for example, the U.S. Congress enacted a tax cut into law. At such times, the political rhetoric often focuses on how people experiencing hard times need relief from taxes. The aggregate supply and aggregate demand framework, however, offers a complementary rationale, as Figure 11.9 illustrates. 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 Clear It Up feature to consider the question of whether economists favor tax cuts or oppose them.

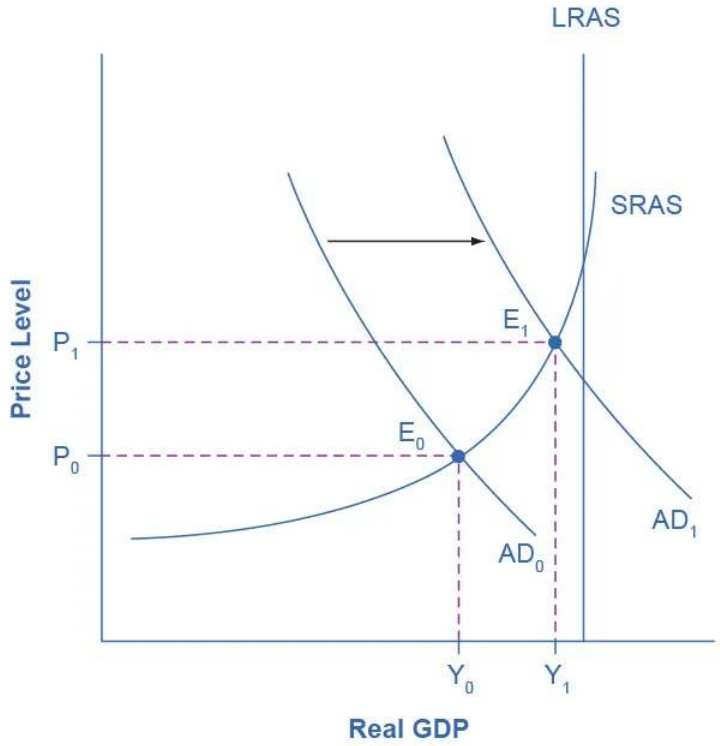


Figure 11.9 Recession and Full Employment in the AD/AS Model Whether the economy is in a recession is illustrated in the AD/AS model by how close the equilibrium is to the potential GDP line as indicated by the vertical LRAS line. In this example, the level of output Y_0 at the equilibrium E_0 is relatively 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.

Clear It Up

Do economists favor tax cuts or oppose them?

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 tax cut package through Congress early in 2001. More recently in 2017 and 2018, Donald Trump initiated a new round of tax cuts throughout the economy, and President Biden promised his own set of tax cuts in his 2021 spending bills.

What side do economists take? 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 equally large government spending cuts accompany the tax cuts. Economists differ, as does any broad cross-section of the public, on how large government spending should be and what programs the government might cut back. A second issue, more relevant to the discussion in this chapter, concerns how close the economy is to the full employment output level. In a recession, when the AD and AS curves intersect 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 performing extremely well, tax cuts may shift AD so far to the right as to generate inflationary pressures, with little gain to GDP.

With the AD/AS framework in mind, many economists might readily believe that the 1981 Reagan tax cuts, which took effect just after two serious recessions, were beneficial economic policy. Similarly, Congress enacted the 2001 Bush tax cuts and the 2009 Obama tax cuts during recessions. However, some of the same economists who favor tax cuts during recession would be much more dubious about identical tax cuts at a time the economy is performing well and cyclical unemployment is low.

Government spending and tax rate changes can be useful tools to affect aggregate demand. We will discuss these in greater detail in the Government Budgets and Fiscal Policy chapter and The Impacts of Government Borrowing. Other policy tools can shift the aggregate demand curve as well. For example, as we will discuss in the Monetary Policy and Bank Regulation chapter, the Federal Reserve can affect interest rates and credit availability. 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.

Clarifying the details of these alternative policies and how they affect the components of aggregate demand can wait for The Keynesian Perspective chapter. 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 AS curve's relatively flat or relatively steep portion.

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14.6: How the AD/AS Model Incorporates Growth, Unemployment, and Inflation

Learning Objectives

By the end of this section, you will be able to:

- Use the aggregate demand/aggregate supply model to show periods of economic growth and recession
- Explain how unemployment and inflation impact the aggregate demand/aggregate supply model
- Evaluate the importance of the aggregate demand/aggregate supply model

The AD/AS model can convey a number of interlocking relationships between the three macroeconomic goals of growth, unemployment, and low inflation. Moreover, the AD/AS framework is flexible enough to accommodate both the Keynes' law approach that focuses on aggregate demand and the short run, while also including the Say's law approach that focuses on aggregate supply and the long run. These advantages are considerable. Every model is a simplified version of the deeper reality and, in the context of the AD/AS model, the three macroeconomic goals arise in ways that are sometimes indirect or incomplete. In this module, we consider how the AD/AS model illustrates the three macroeconomic goals of economic growth, low unemployment, and low inflation.

Growth and Recession in the AD/AS Diagram

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. Earlier Figure 11.7 (a) showed a pattern of economic growth over three years, with the AS curve shifting slightly out to the right each year. 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 AD/AS diagram.

In the short run, GDP falls and rises in every economy, as the economy dips into recession or expands out of recession. The AD/AS diagram illustrates recessions when the equilibrium level of real GDP is substantially below potential GDP, as we see at the equilibrium point E_0 in Figure 11.9. From another standpoint, in years of resurgent economic growth the equilibrium will typically be close to potential GDP, as equilibrium point E_1 in that earlier figure shows.

Unemployment in the AD/AS Diagram

We described two types of unemployment in the Unemployment chapter. Short run variations in unemployment (cyclical unemployment) are caused by the business cycle as the economy expands and contracts. Over the long run, in the United States, the unemployment rate typically hovers around 5% (give or take one percentage point or so), when the economy is healthy. In many of the national economies across Europe, the unemployment rate in recent decades has only dropped to about 10% or a bit lower, even in good economic years. We call this baseline level of unemployment that occurs year-in and year-out the natural rate of unemployment and we determine it by how well the structures of market and government institutions in the economy lead to a matching of workers and employers in the labor market. Potential GDP can imply different unemployment rates in different economies, depending on the natural rate of unemployment for that economy.

The AD/AS diagram shows cyclical unemployment by how close the economy is to the potential or full GDP employment level. Returning to Figure 11.9, relatively low cyclical unemployment for an economy occurs when the level of output is close to potential GDP, as in the equilibrium point E_1. Conversely, high cyclical unemployment arises when the output is substantially to the left of potential GDP on the AD/AS diagram, as at the equilibrium point E_0. Although we do not show the factors that determine the natural rate of unemployment separately in the AD/AS model, they are implicitly part of what determines potential GDP or full employment GDP in a given economy.

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 generally decline during recessions. As an extreme example, inflation actually became negative—a situation called "deflation"—during the Great Depression. Even during the relatively short 1991-1992

recession, the inflation rate declined from 5.4% in 1990 to 3.0% in 1992. During the relatively short 2001 recession, the rate of inflation declined from 3.4% in 2000 to 1.6% in 2002. During the deep recession of 2007–2009, the inflation rate 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. Instead, it has stayed in the 1–5% range 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 AS curve's steep portion. In Figure 11.10 (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.

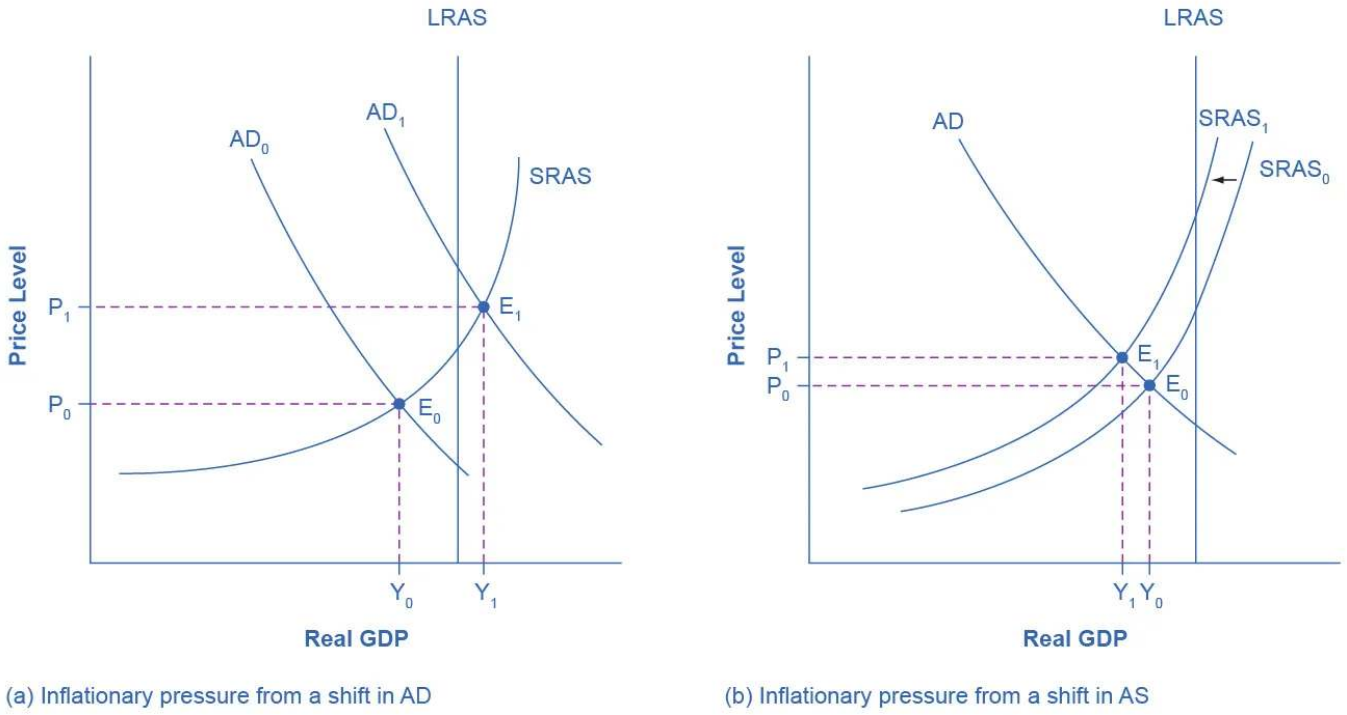


Figure 11.10 Sources of Inflationary Pressure in the AD/AS Model (a) A shift in aggregate demand, from AD_0 to AD_1, when it happens in the area of the SRAS curve that is near potential GDP, will lead to a higher price level and to pressure for a higher price level and inflation. The new equilibrium (E1) is at a higher price level (P1) than the original equilibrium. (b) A shift in aggregate supply, from $SRAS_0$ to $SRAS_1$, 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 11.10 (b), the SRAS curve's shift 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, passing 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 SRAS curve's steep portion. A second possibility is that, if inflation has been occurring for several years, people might begin to expect a certain level of inflation. If they do, then these expectations will cause prices, wages and interest rates to increase annually by the amount of the inflation expected. 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.

Importance of the Aggregate Demand/Aggregate Supply 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 course (like the budget constraint diagram that we introduced in the Choice in a World of Scarcity chapter and the supply and demand diagram in the Demand and Supply chapter) because it provides an overall framework for bringing these factors together in one diagram. Some version of the AD/AS model will appear in every chapter in the rest of this book.

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14.7: Keynes' Law and Say's Law in the AD/AS Model

Learning Objectives

By the end of this section, you will be able to:

- Identify the neoclassical zone, the intermediate zone, and the Keynesian zone in the aggregate demand/aggregate supply model
- Use an aggregate demand/aggregate supply model as a diagnostic test to understand the current state of the economy

We can use the AD/AS model to illustrate both Say's law that supply creates its own demand and Keynes' law that demand creates its own supply. Consider the SRAS curve's three zones which Figure 11.11 identifies: the Keynesian zone, the neoclassical zone, and the intermediate zone.

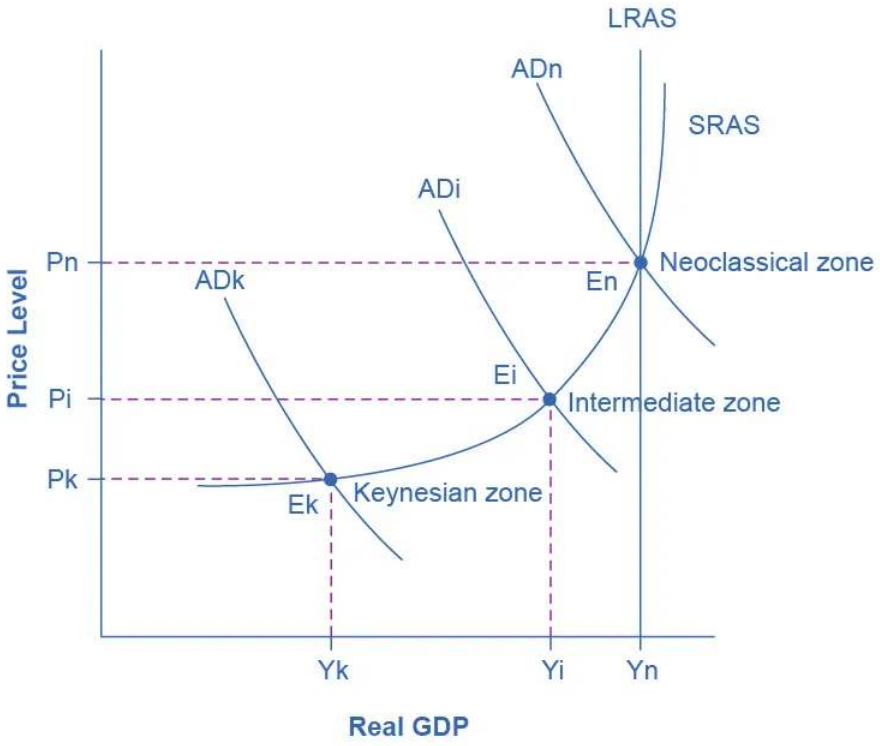


Figure 11.11 Keynes, Neoclassical, and Intermediate Zones in the Aggregate Supply Curve Near the equilibrium Ek, in the Keynesian zone at the far left of the SRAS curve, small shifts in AD, either to the right or the left, will affect the output level Yk, but will not much affect the price level. In the Keynesian zone, AD largely determines the quantity of output. Near the equilibrium En, in the neoclassical zone at the SRAS curve's far right, 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.

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.

Finally, consider the SRAS curve's intermediate zone in Figure 11.11. 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 we can apply to an economy, like a doctor checking a patient for symptoms. First, figure out in what zone the economy is. This will clarify the economic issues, tradeoffs, and policy choices. 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. The Keynesian Perspective and The Neoclassical Perspective should help to clarify the underpinnings and consequences of these contrasting views of the macroeconomy.

Bring It Home

The Pandemic-Induced Recession: Supply or Demand?

We mentioned earlier that a pandemic could cause a shock in the short- or long-run aggregate supply curve by temporarily reducing labor supply and slowing or stopping production of goods and services. Pandemics can also affect aggregate demand. When people are hesitant to spend or travel, or if they are not allowed to spend or travel because of social restrictions, this will affect spending in the economy. Consumers spend less at restaurants, hotels, and travel, among other areas, while firms stop investing because of the lack of demand and an uncertain future. Both actions lead to a leftward shift in the aggregate demand curve.

While there is some debate over whether the pandemic-induced recession that the U.S. economy experienced in 2020 was primarily a supply- or demand-driven one, most likely, it is a combination of both. In March and April 2020, workers left the labor market en masse, and later in the year, they were hesitant to return due to health and safety concerns. Many people were also forced to cancel travel plans or voluntarily did so out of concern for their safety, further reducing aggregate demand. These changes caused deep cuts in the global economy that continued to be felt two years after the initial pandemic-induced shocks.

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14.8: Key Terms

aggregate demand (AD)
the amount of total spending on domestic goods and services in an economy

aggregate demand (AD) curve
the total spending on domestic goods and services at each price level

aggregate demand/aggregate supply model
a model that shows what determines total supply or total demand for the economy, and how total demand and total supply interact at the macroeconomic level

aggregate supply (AS)
the total quantity of output (i.e. real GDP) firms will produce and sell

aggregate supply (AS) curve
the total quantity of output (i.e. real GDP) that firms will produce and sell at each price level

full-employment GDP
another name for potential GDP, when the economy is producing at its potential and unemployment is at the natural rate of unemployment

intermediate zone
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

Keynes' law
"demand creates its own supply"

Keynesian zone
portion of the SRAS curve where GDP is far below potential and the SRAS curve is flat

long run aggregate supply (LRAS) curve
vertical line at potential GDP showing no relationship between the price level for output and real GDP in the long run

neoclassical economists
economists who generally emphasize the importance of aggregate supply in determining the size of the macroeconomy over the long run

neoclassical zone
portion of the SRAS curve where GDP is at or near potential output where the SRAS curve is steep

potential GDP
the maximum quantity that an economy can produce given full employment of its existing levels of labor, physical capital, technology, and institutions

Say's law
"supply creates its own demand"

short run aggregate supply (SRAS) curve
positive short run relationship between the price level for output and real GDP, holding the prices of inputs fixed

stagflation

an economy experiences stagnant growth and high inflation at the same time

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14.9: Key Concepts and Summary

11.1 Macroeconomic Perspectives on Demand and Supply

Neoclassical economists emphasize Say's law, which holds that supply creates its own demand. 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.

11.2 Building a Model of Aggregate Demand and Aggregate Supply

The upward-sloping short run aggregate supply (SRAS) curve shows the positive relationship between the price level and the level of real GDP in the short run. Aggregate supply slopes up because when the price level for outputs increases, while the price level of inputs remains fixed, the opportunity for additional profits encourages more production. The aggregate supply curve is near-horizontal on the left and near-vertical on the right. In the long run, we show the aggregate supply by a vertical line at the level of potential output, which is the maximum level of output the economy can produce with its existing levels of workers, physical capital, technology, and economic institutions.

The downward-sloping aggregate demand (AD) curve shows the relationship between the price level for outputs and the quantity of total spending in the economy. It slopes down because of: (a) the wealth effect, which means that a higher price level leads to lower real wealth, which reduces the level of consumption; (b) the interest rate effect, which holds that a higher price level will mean a greater demand for money, which will tend to drive up interest rates and reduce investment spending; and (c) the foreign price effect, which holds that a rise in the price level will make domestic goods relatively more expensive, discouraging exports and encouraging imports.

11.3 Shifts in Aggregate Supply

The aggregate demand/aggregate supply (AD/AS) diagram shows how AD and AS interact. The intersection of the AD and AS curves shows the equilibrium output and price level in the economy. Movements of either AS or AD will result in a different equilibrium output and price level. The aggregate supply curve will shift out to the right as productivity increases. It will shift back to the left as the price of key inputs rises, and will shift out to the right if the price of key inputs falls. If the AS curve shifts back to the left, the combination of lower output, higher unemployment, and higher inflation, called stagflation, occurs. If AS shifts out to the right, a combination of lower inflation, higher output, and lower unemployment is possible.

11.4 Shifts in Aggregate Demand

The AD curve will shift out as the components of aggregate demand—C, I, G, and X–M—rise. It will shift back to the left as these components fall. These factors can change because of different personal choices, like those resulting from consumer or business confidence, or from policy choices like changes in government spending and taxes. If the AD curve shifts to the right, then the equilibrium quantity of output and the price level will rise. If the AD curve shifts to the left, then the equilibrium quantity of output and the price level will fall. Whether equilibrium output changes relatively more than the price level or whether the price level changes relatively more than output is determined by where the AD curve intersects with the AS curve.

The AD/AS diagram superficially resembles the microeconomic supply and demand diagram on the surface, but in reality, what is on the horizontal and vertical axes and the underlying economic reasons for the shapes of the curves are very different. We can illustrate long-term economic growth in the AD/AS framework by a gradual shift of the aggregate supply curve to the right. We illustrate a recession when the intersection of AD and AS is substantially below potential GDP, while we illustrate an expanding economy when the intersection of AS and AD is near potential GDP.

11.5 How the AD/AS Model Incorporates Growth, Unemployment, and Inflation

Cyclical unemployment is relatively large in the AD/AS framework when the equilibrium is substantially below potential GDP. Cyclical unemployment is small in the AD/AS framework when the equilibrium is near potential GDP. The natural rate of unemployment, as determined by the labor market institutions of the economy, is built into what economists mean by potential GDP, but does not otherwise appear in an AD/AS diagram. The AD/AS framework shows pressures for inflation to rise or fall when the movement from one equilibrium to another causes the price level to rise or to fall. The balance of trade does not appear directly

in the AD/AS diagram, but it appears indirectly in several ways. Increases in exports or declines in imports can cause shifts in AD. Changes in the price of key imported inputs to production, like oil, can cause shifts in AS. The AD/AS model is the key model we use in this book to understand macroeconomic issues.

11.6 Keynes' Law and Say's Law in the AD/AS Model

We can divide the SRAS curve into three zones. Keynes' law says demand creates its own supply, so that changes in aggregate demand cause changes in real GDP and employment. We can show Keynes' law 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. We can show Say's law 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.

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CHAPTER OVERVIEW

15: Exchange Rates and International Capital Flows

15.1: Introduction to Exchange Rates and International Capital Flows

15.2: How the Foreign Exchange Market Works

15.3: Demand and Supply Shifts in Foreign Exchange Markets

15.4: Macroeconomic Effects of Exchange Rates

15.5: Exchange Rate Policies

15.6: Key Terms

15.7: Key Concepts and Summary

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15.1: Introduction to Exchange Rates and International Capital Flows



Figure 16.1 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 “US Dollar banknotes” by Milad Mosapoor/Wikimedia Commons, Public Domain)

Chapter Objectives

In this chapter, you will learn about:

- How the Foreign Exchange Market Works
- Demand and Supply Shifts in Foreign Exchange Markets
- Macroeconomic Effects of Exchange Rates
- Exchange Rate Policies

Bring It Home

Is a Stronger Dollar Good for the U.S. Economy?

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 chapter 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), in June 2016; the pound 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 chapter 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. The first module of this chapter begins with an overview of foreign exchange markets: their size, their main participants, and the vocabulary for discussing movements of exchange rates. The following module uses demand and supply graphs to analyze some of the main factors that cause shifts in exchange rates. A final module then brings 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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15.2: How the Foreign Exchange Market Works

Learning Objectives

By the end of this section, you will be able to:

- Define "foreign exchange market"
- Describe different types of investments like foreign direct investments (FDI), portfolio investments, and hedging
- Explain how appreciating or depreciating currency affects exchange rates
- Identify who benefits from a stronger currency and benefits from a weaker currency

Most countries have different currencies, but not all. Sometimes small economies use an economically larger neighbor's currency. 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. A large-scale example of a common currency is the decision by 17 European nations—including some very large economies such as France, Germany, and Italy—to replace their former currencies with the euro at the start of 1999. With these exceptions, most of the international economy takes place in a situation of multiple national currencies in which both people and firms need to convert from one currency to another when selling, buying, hiring, borrowing, traveling, or investing across national borders. We call the market in which people or firms use one currency to purchase another currency the foreign exchange market.

You have encountered the basic concept of exchange rates in earlier chapters. In The International Trade and Capital Flows, for example, we discussed how economists use exchange rates to compare GDP statistics from countries where they measure GDP in different currencies. These earlier examples, however, took the actual exchange rate as given, as if it were a fact of nature. In reality, the 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 the operation of supply and demand in markets.

Link It Up

Visit this website for an exchange rate calculator.

The Extraordinary Size of the Foreign Exchange Markets

If you travel to a foreign country that uses a different currency, you will undoubtedly need to make a trip to a bank or foreign currency office to exchange whatever currency you're holding for that country's currency. Even though this is a simple transaction, it is part of a very large market. The quantities traded in foreign exchange markets are breathtaking. A 2019 Bank of International Settlements survey 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, 2019 U.S. real GDP was $21.4 trillion *per year*.

Your transaction is simple enough. Suppose you carry a $100 bill. You bring it into the foreign currency office and look up, and you see a bunch of different numbers on a digital board. For example, if you are traveling to Turkey, whose national currency is the Turkish Lira, one line of the board might read: "U.S. DOLLARS: BUY 5.50; SELL 5.80." This means that the office will give you 5.50 Turkish Lira in exchange for 1 U.S. dollar. If you have $100, the office will give you 550 Turkish Lira. If you want to *sell* Turkish Lira for U.S. dollars, the office will surely buy them from you, but not at the same exchange rate, since the office will make some money on the exchange. So if you bring 550 Turkish Lira and ask for U.S. dollars, it will not give you 100 dollars, but instead about $95. The important point is that this one transaction, when repeated all over the world for all sorts of different transactions, ends up totaling $6.6 trillion worth of exchanges per day.

Table 16.1 shows the currencies most commonly traded on foreign exchange markets. The U.S. dollar dominates the foreign exchange market, being on one side of 88.3% of all foreign exchange transactions. The U.S. dollar is followed by the euro, the British pound, the Australian dollar, and the Japanese yen.

Currency	% Daily Share
U.S. dollar	88.3%
Euro	32.3%
Japanese yen	16.8%
British pound	12.8%
Australian dollar	6.8%
Canadian dollar	5.0%
Swiss franc	5.0%
Chinese yuan	4.3%

Table 16.1 Currencies Traded Most on Foreign Exchange Markets as of September, 2019 The "% Daily Share" shows the percentage of transactions where the currency is on one side of the exchange. (Source: https://www.bis.org/statistics/rpfx19_fx.pdf)

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 are involved in international trade of goods and services; (2) tourists visiting other countries; (3) international investors buying ownership (or part-ownership) of a foreign firm; (4) international investors making financial investments that do not involve ownership. Let's consider these categories in turn.

Firms that buy and sell on international markets 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. Thus, 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 will supply their home currency to receive the currency of the country they are visiting. For example, an American tourist who is visiting China will supply U.S. dollars into the foreign exchange market and demand Chinese yuan.

We often divide financial investments that cross international boundaries, and require exchanging currency into two categories. Foreign direct investment (FDI) refers to purchasing a firm (at least ten percent) 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, InBev would have 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 U.K. government bonds, 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.

Business people often link portfolio investment to expectations about how exchange rates will shift. Look at a U.S. financial investor who is considering purchasing U.K. issued bonds. For simplicity, ignore any bond interest payment (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 16.2 (a) shows, this investor would change $24,000 for 16,000 British pounds. In a month, if the pound is 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 Figure 16.2 (b) shows, 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 will suffer losses if the exchange rates do not move as predicted.

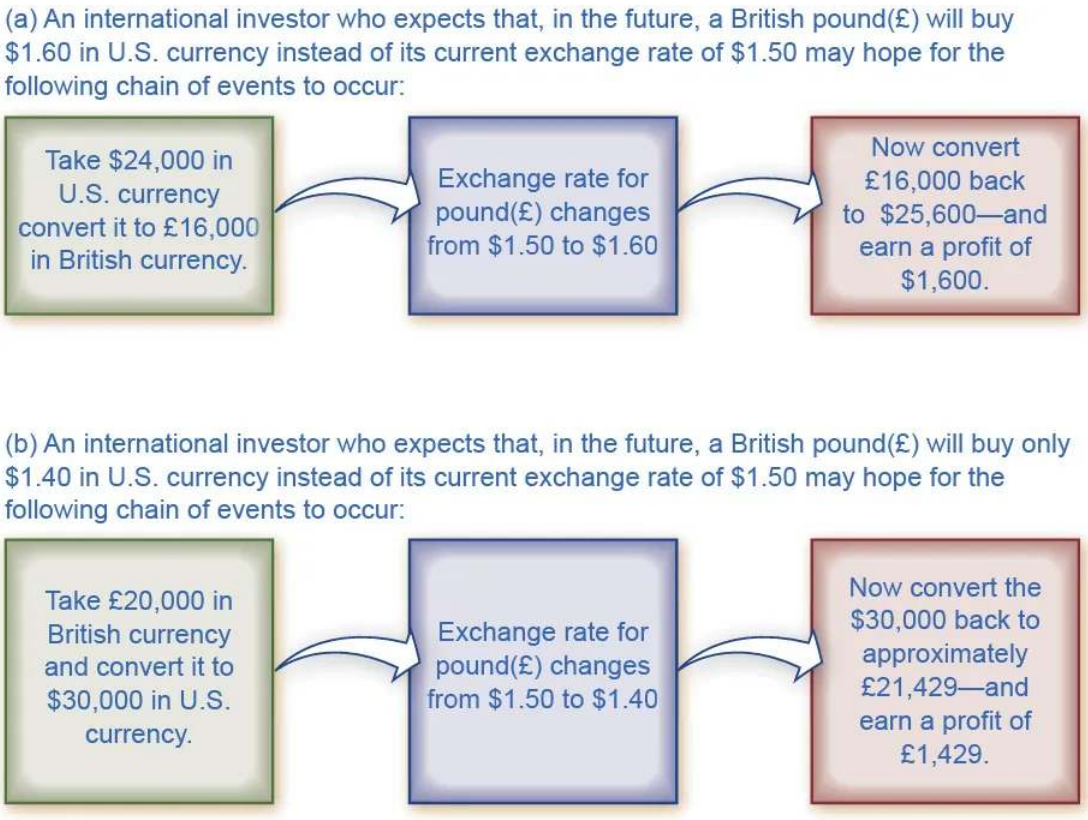


Figure 16.2 A Portfolio Investor Trying to Benefit from Exchange Rate Movements Expectations of a currency's future value can drive its demand and supply in foreign exchange markets.

Many portfolio investment decisions are not as simple as betting that the currency's value 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. However, 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 a risk from one of your investments (in this case, currency risk from the contract). 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. However, if the value of the euro in dollars declines, then you are protected by the hedge. When parties wish to enter financial contracts like hedging, they normally rely on a financial institution or brokerage company to handle the hedging. These companies either take a fee or create a spread in the exchange rate in order to earn money through the service they provide.

Both foreign direct investment and portfolio investment involve an investor who supplies domestic currency and demands a foreign currency. With portfolio investment, the client purchases less than ten percent of a company. As such, business players often get involved with portfolio investment with a short term focus. With foreign direct investment the investor purchases more than ten percent of a company and the investor typically assumes some managerial responsibility. Thus, foreign direct investment tends to have a more long-run focus. As a practical matter, an investor can withdraw portfolio investments from a country much more quickly than foreign direct investments. A U.S. portfolio investor who wants to buy or sell U.K. government bonds can do so with a phone call or a few computer keyboard clicks. 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 16.2 summarizes the main categories of currency demanders and suppliers.

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

Table 16.2 The Demand and Supply Line-ups in Foreign Exchange Markets

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. 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.

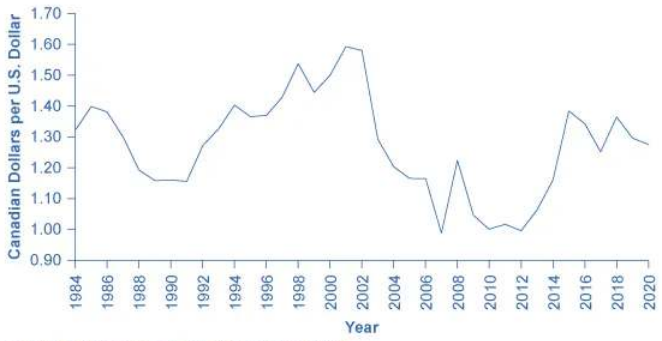
In the world economy, roughly 2,000 firms are foreign exchange dealers. The U.S. economy has less than 100 foreign exchange dealers, but the largest 12 or so dealers carry out more than half the total transactions. The foreign exchange market has no central location, but the major dealers keep a close 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 23.5% of global GDP or about $19 trillion per year. Foreign direct investment totaled about $870 billion in the end of 2021. These quantities are dwarfed, however, by the $6.6 trillion *per day* 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 large foreign exchange dealers' actions as they constantly buy and sell with each other.

Strengthening and Weakening Currency

When the prices of most goods and services change, the price "rises or "falls". For exchange rates, the terminology is different. When the exchange rate for a currency rises, so that the currency exchanges for more of other currencies, we refer to it as appreciating or “strengthening.” When the exchange rate for a currency falls, so that a currency trades for less of other currencies, we refer to it 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 16.3 (a). The vertical axis in Figure 16.3 (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 August 2022, the U.S. dollar stood at $1.28 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 of one unit of currency by using a different currency.



(a) U.S. dollar exchange rate in Canadian dollars

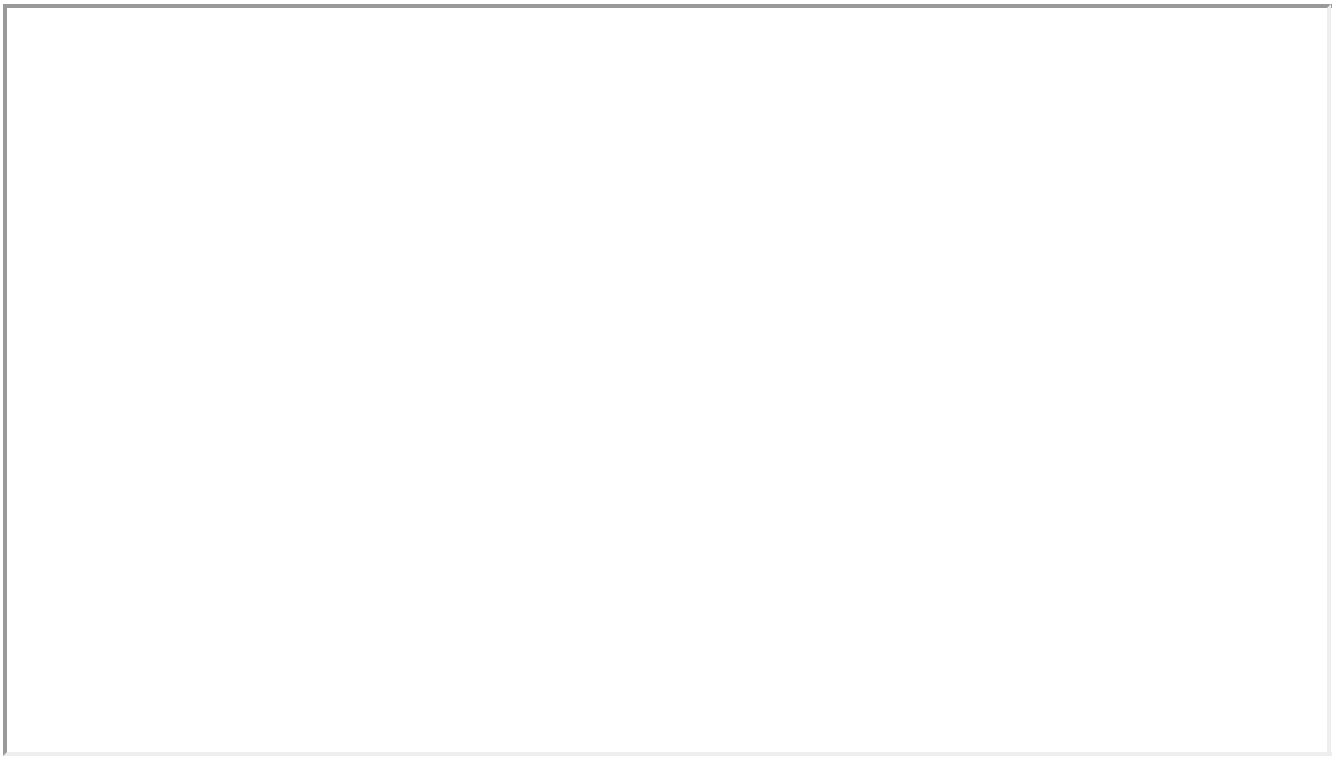


(b) Canadian dollar exchange rate in U.S. dollars

Figure 16.3 Strengthen or Appreciate vs. Weaken or Depreciate Exchange rates tend to fluctuate substantially, even between bordering companies 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 16.3 (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, in Figure 16.3 (a), is a perfect mirror image with the Canadian dollar exchange rate measured in U.S. dollars, in Figure 16.3 (b). A fall in the Canada $/U.S. $ ratio means a rise in the U.S. $/Canada $ ratio, and vice versa.

Click to view content



Canadian Dollars per 1 U.S. Dollar.

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 how a stronger or weaker currency will affect different market participants. Consider, for example, the impact of a stronger U.S. dollar on six different groups of economic actors, as Figure 16.4 shows: (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 16.4 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 exporting firm's home currency, will now buy more 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 February 2018, $1 bought 11.9 South African rand, so the tourist had 59,500 rand to spend. By 2018, $1 bought 14.5 rand, which for the tourist translates to 72,500 rand. 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 first column in Figure 16.4 illustrates the corresponding happy or unhappy economic reactions. The following Work It Out feature centers the analysis on the opposite: a weaker dollar.

Work It Out

Effects of a Weaker Dollar

Let's work through the effects of a weaker dollar on a U.S. exporter, a foreign exporter into the United States, a U.S. tourist going abroad, a foreign tourist coming to the United States, a U.S. investor abroad, and a foreign investor in the United States.

Step 1. 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 / $1.30 per British pound, or £19,231. The dollar affects the price foreigners face who may purchase U.S. exports.

Step 2. 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.

Step 3. Summarize that a weaker U.S. dollar leads to an increase in U.S. exports. For a foreign exporter, the outcome is just the opposite.

Step 4. 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 $1.30 per British pound, the price for the grocery store is 6.00 × $1.30 = $7.80 per six pack. If the dollar weakens to $2.00 per pound, the price of Bass Ale is now 6.00 × $2.00 = $12.

Step 5. Summarize 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.

Step 6. Consider U.S. tourists going abroad. They 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.

Step 7. 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.

Step 8. Note that 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.

Step 9. Note also that 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 module shows how players can use the tools of demand and supply in foreign exchange markets to explain the underlying causes of stronger and weaker currencies (we address "stronger" and "weaker" more in the following Clear It Up feature).

Clear It Up

Why is a stronger currency not necessarily better?

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”? 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.

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15.3: Demand and Supply Shifts in Foreign Exchange Markets

Learning Objectives

By the end of this section, you will be able to:

- Explain supply and demand for exchange rates
- Define arbitrage
- Explain purchasing power parity's importance when comparing countries.

The foreign exchange market involves firms, households, and investors who demand and supply currencies coming together through their banks and the key foreign exchange dealers. Figure 16.5 (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 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.

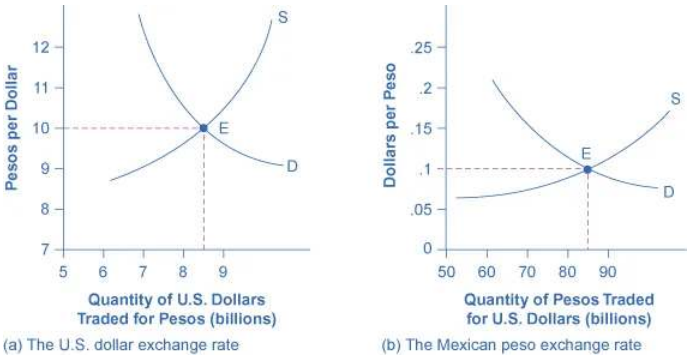


Figure 16.5 Demand and Supply for the U.S. Dollar and Mexican Peso Exchange Rate (a) The quantity measured on the horizontal axis is in U.S. dollars, and the exchange rate on the vertical axis is the price of U.S. dollars measured in Mexican pesos. (b) The quantity measured on the horizontal axis is 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 16.5 (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 for U.S. dollars. What factors would cause the demand or supply to shift, thus leading to a change in the equilibrium exchange rate? We discuss the answer to this question in the following section.

Expectations about Future Exchange Rates

One reason to demand a currency on the foreign exchange market is the belief that the currency's value is about to increase. One reason to supply a currency—that is, sell it on the foreign exchange market—is the expectation that the currency's value 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. Figure 16.6 illustrates the likely effects of such an article. 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.



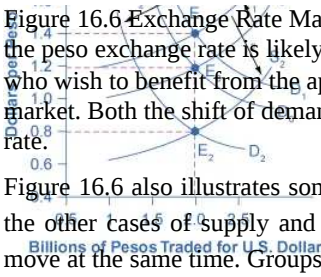


Figure 16.6 Exchange Rate Market for Mexican Peso Reacts to Expectations about Future Exchange Rates An announcement that the peso exchange rate is likely to strengthen in the future will lead to greater demand for the peso in the present from investors who wish to benefit from the appreciation. Similarly, it will make investors less likely to supply pesos to the foreign exchange market. Both the shift of demand to the right and the shift of supply to the left cause an immediate appreciation in the exchange rate.

Figure 16.6 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. However, 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 currency's appreciation 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 will 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 previously. 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 Figure 16.7 shows. 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—a connection that we will discuss in more detail later in this chapter.

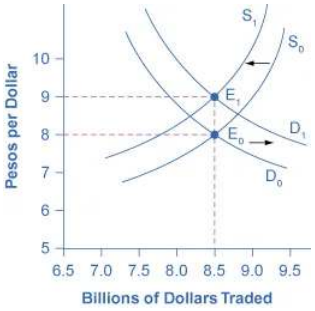


Figure 16.7 Exchange Rate Market for U.S. Dollars Reacts to Higher Interest Rates A higher rate of return for U.S. dollars makes holding dollars more attractive. Thus, the demand for dollars in the foreign exchange market shifts to the right, from D_0 to D_1, while the supply of dollars shifts to the left, from S_0 to S_1. The new equilibrium (E_1) has a stronger exchange rate than the original equilibrium (E_0), but in this example, the equilibrium quantity traded does not change.

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 16.8 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 peso's purchasing power in Mexico. The peso's exchange rate value declined as well. Figure 16.8 shows that the demand for the peso on foreign exchange markets decreased from D_0 to D_1, while the peso's supply 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.

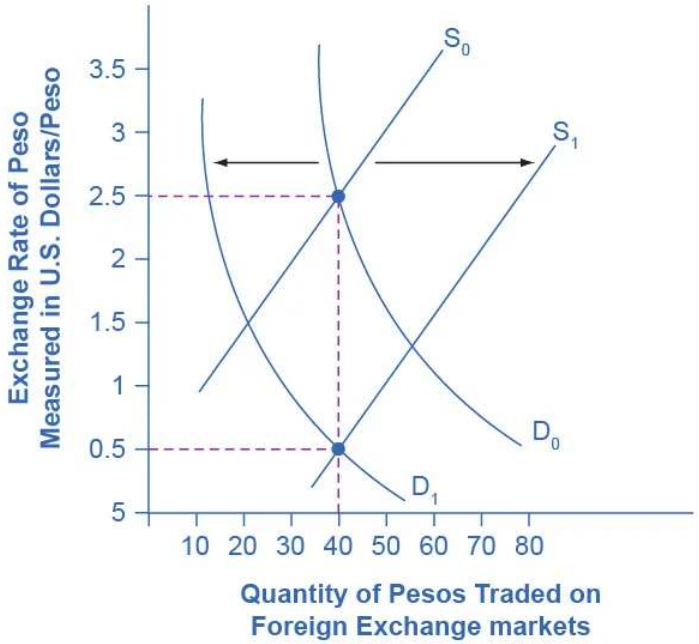


Figure 16.8 Exchange Rate Markets React to Higher Inflation If a currency is experiencing relatively high inflation, then its buying power is decreasing and international investors will be less eager to hold it. Thus, a rise in inflation in the Mexican peso would lead demand to shift from D_0 to D_1, and supply to increase from S_0 to S_1. Both movements in demand and supply would cause the currency to depreciate. Here, we draw no effect on the quantity traded, but in truth it could be an increase or a decrease, depending on the actual movements of demand and supply.

Link It Up

Visit this website to learn about the Big Mac index.

Purchasing Power Parity

Over the long term, exchange rates must bear some relationship to the currency's buying power in terms of internationally traded goods. 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 \$1.30 in Canadian currency, then a car that sells for \$20,000 in the United States should sell for \$26,000 in Canada. If the price of cars in Canada were much lower than \$26,000, 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 were much higher than \$26,000 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.

We call the exchange rate that equalizes the prices of internationally traded goods across countries 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.

The purchasing power parity exchange rate has two functions. First, economists often use PPP exchange rates 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. However, should you use the market exchange rate or the PPP exchange rate? Market exchange rates bounce around. In 2014, the exchange rate was 105 yen/dollar, but in late 2015 the U.S. dollar exchange rate versus the yen was 121 yen/dollar. For simplicity, say that Japan's GDP was ¥500 trillion in both 2014 and 2015. If you use the market exchange rates, then Japan's GDP will be $4.8 trillion in 2014 (that is, ¥500 trillion /(¥105/dollar)) and $4.1 trillion in 2015 (that is, ¥500 trillion /(¥121/dollar)).

The misleading appearance of a changing 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 to it as time passes. It is true that in the short 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. However, knowing the PPP will allow you to track and predict exchange rate relationships.

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15.4: Macroeconomic Effects of Exchange Rates

Learning Objectives

By the end of this section you will be able to:

- Explain how exchange rate shifting influences aggregate demand and supply
- Explain how shifting exchange rates also can influence loans and banks

A central bank will be concerned about the exchange rate for multiple 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–this may contribute to an unsustainable balance of trade and large inflows of international financial capital, which can set up the economy for a deep recession if international investors decide to move their money to another country. Let's discuss these scenarios in turn.

Exchange Rates, Aggregate Demand, and Aggregate Supply

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 $1.16/euro, which dropped to a low of about $0.83/euro in 2000. By the end of 2013, the euro had risen (and the U.S. dollar had correspondingly weakened) to $1.37/euro. However, by the beginning of 2021, the exchange rate was down to $1.12/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. At a time 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. In the beginning of 2021, with the exchange rate back at $1.12/euro the firm would suffer a loss once again. 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.

Fluctuations in Exchange Rates

Exchange rates can fluctuate a great deal in the short run. As yet one more example, the Indian rupee moved from 39 rupees/dollar in February 2008 to 51 rupees/dollar in March 2009, a decline of more than one-fourth in the value of the rupee on foreign exchange markets. Figure 16.9 earlier showed 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. 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. Financial institutions measure 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 16.9 shows how this pattern of international borrowing can work. A bank in Thailand borrows one million in 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.

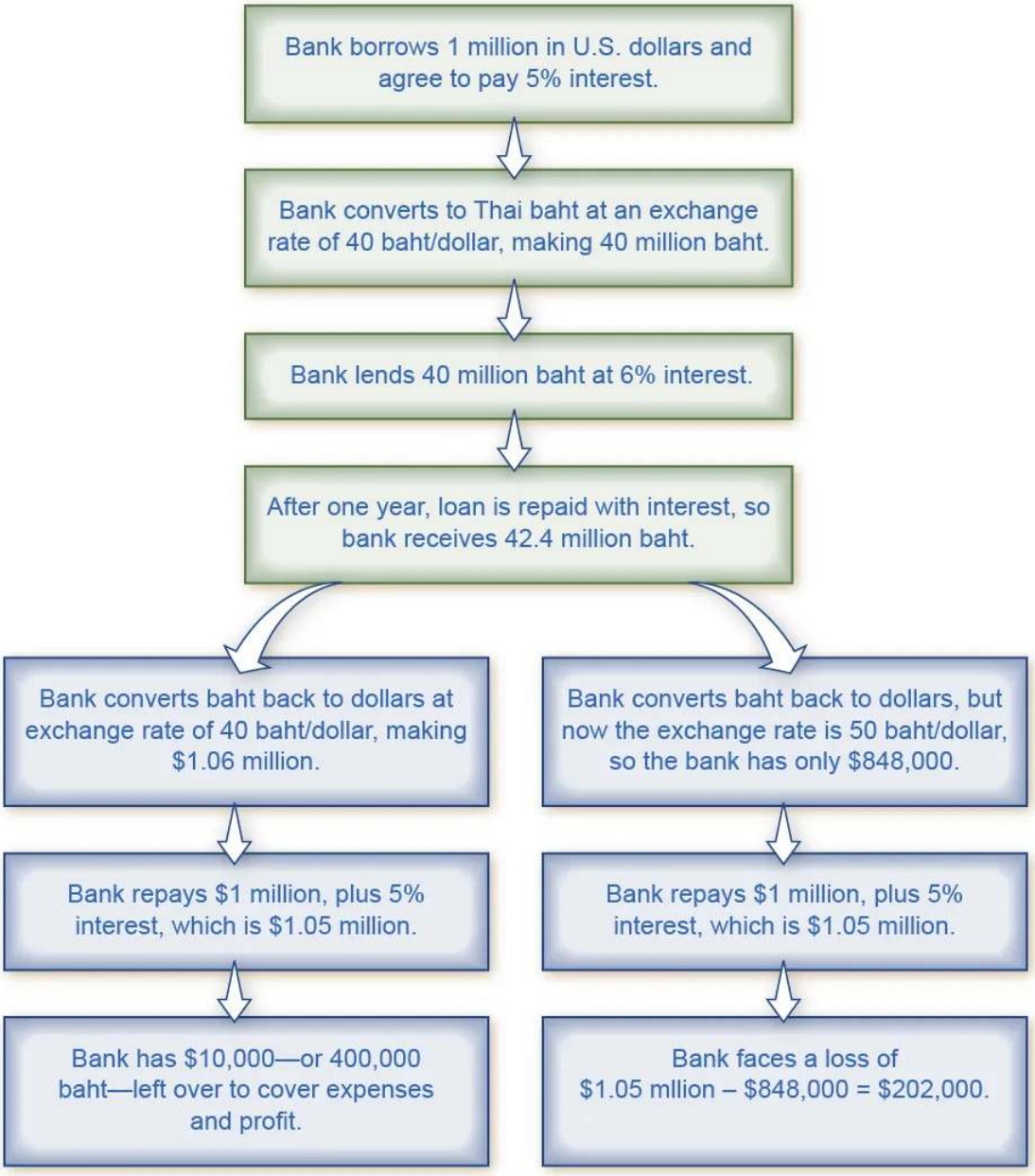


Figure 16.9 International Borrowing The scenario of international borrowing that ends on the left is a success story, but the scenario that ends on the right shows what happens when the exchange rate weakens.

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 16.9 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. However, 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 were 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. For more on this concern, return to the chapter on The International Trade and Capital Flows.

Summing Up Public Policy and Exchange Rates

Every nation would prefer a stable exchange rate to facilitate international trade and reduce the degree of risk and uncertainty in the economy. However, a nation may sometimes want a weaker exchange rate to stimulate aggregate demand and reduce a recession, or a stronger exchange rate to fight inflation. The country must also be concerned that rapid movements from a weak to a strong exchange rate may hurt its export industries, while rapid movements from a strong to a weak exchange rate can hurt its banking sector. In short, every choice of an exchange rate—whether it should be stronger or weaker, or fixed or changing—represents potential tradeoffs.

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15.5: Exchange Rate Policies

Learning Objectives

By the end of this section, you will be able to:

- 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 come in a range of different forms listed in Figure 16.10: 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 16.10 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 exchange rate's value, to a common currency where the nation adopts another country or group of countries' currency.

Floating Exchange Rates

We refer to a policy which allows the foreign exchange market to set exchange rates 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 16.11 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. Since 2015, it has dropped again; by the end of December 2020, the exchange rate stood at 103 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.

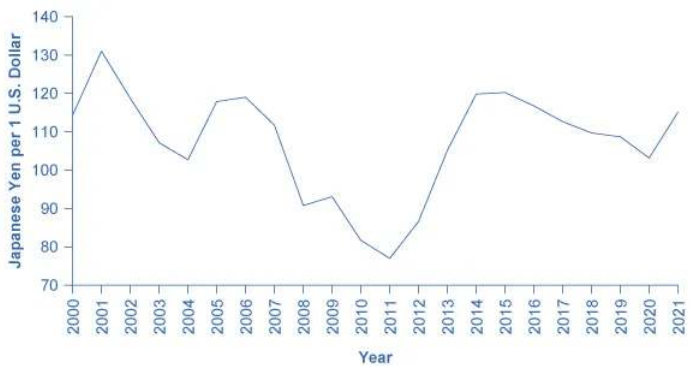


Figure 16.11 U.S. Dollar Exchange Rate in Japanese Yen Even seemingly stable exchange rates such as the Japanese Yen to the U.S. Dollar can vary when closely examined over time. This figure shows a relatively stable rate between 2011 and 2013. In 2013, there was a drastic depreciation of the Yen (relative to the U.S. Dollar) by about 14% and again at the end of the year in 2014 also

by about 14%. Since then, between 2016 and 2020 there was an appreciation of about 13% from 118 yen per dollar to 103 yen per dollar. (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 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 currency's exchange rate is different from what the market would have produced, it establishes a “peg” for its currency. A soft peg is the name for an exchange rate policy where the government usually allows the market to set exchange rate, 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 the equilibrium E_0 in Figure 16.12 (a) and Figure 16.12 (b) show. However, Brazil's government decides that the exchange rate should be 30 cents/real, as Figure 16.12 (a) shows. 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 government set the target exchange rate sometime in the past, and it is now maintaining it 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.

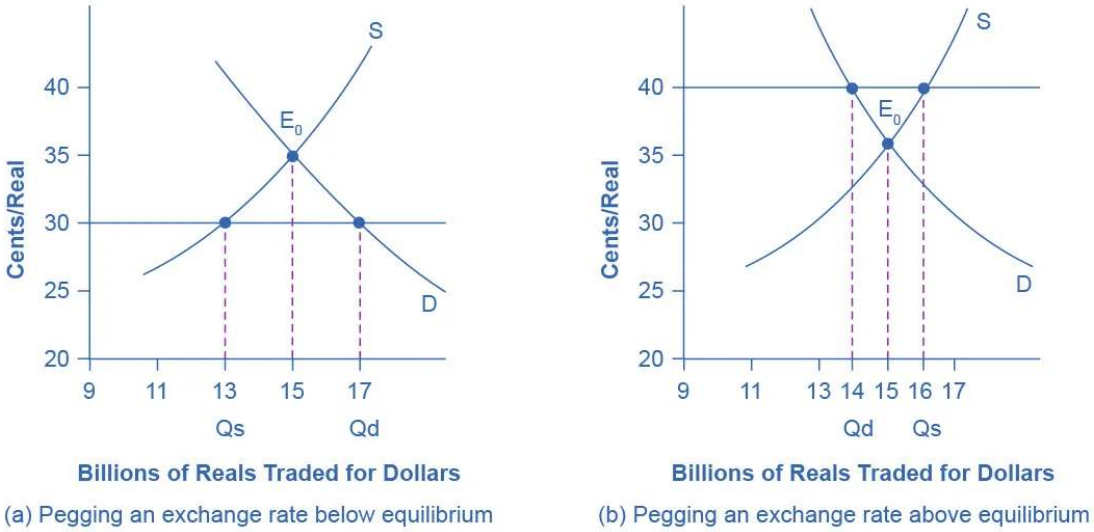


Figure 16.12 Pegging an Exchange Rate (a) If an exchange rate is pegged below what would otherwise be the equilibrium, then the currency's quantity demanded will exceed the quantity supplied. (b) If an exchange rate is pegged above what would otherwise be the equilibrium, then the currency's quantity supplied 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. Central banks do not use this technique often 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 16.12 (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 currency supply 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.

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. However, 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 Clear It Up feature discusses the effects of international capital flows—capital that flows across national boundaries as either portfolio investment or direct investment.

Clear It Up

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 international financial capital inflows and outflows. The government can enact this policy 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.

However, proposals to limit international financial flows have severe practical difficulties. National governments impose taxes, not international ones. If one government imposes a Tobin tax on exchange rate transactions carried out within its territory, a firm based someplace like the Grand Caymans, an island nation in the Caribbean well-known for allowing some financial wheeling and dealing might easily operate the exchange rate market. 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.

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 a Portuguese central bank would have made.

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. Table 16.3 summarizes the range of exchange rates policy choices, with their advantages and disadvantages.

Situation	Floating Exchange Rates	Soft Peg	Hard Peg	Merged Currency
Large short-run fluctuations in exchange rates?	Often considerable 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 ending up 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 end up over time either far above or below the market level	Cannot adjust

Table 16.3 Tradeoffs of Exchange Rate Policies

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 financial markets solely set exchange rates, 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. Alternatively, 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.

Bring It Home

Is a Stronger Dollar Good for the U.S. 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. However, 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."

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15.6: Key Terms

appreciating
when a currency is worth more in terms of other currencies; also called “strengthening”

arbitrage
the process of buying a good and selling goods across borders to take advantage of international price differences

depreciating
when a currency is worth less in terms of other currencies; also called “weakening”

dollarize
a country that is not the United States uses the U.S. dollar as its currency

floating exchange rate
a country lets the exchange rate market determine its currency's value

foreign direct investment (FDI)
purchasing more than ten percent of a firm or starting a new enterprise in another country

foreign exchange market
the market in which people use one currency to buy another currency

hard peg
an exchange rate policy in which the central bank sets a fixed and unchanging value for the exchange rate

hedge
using a financial transaction as protection against risk

international capital flows
flow of financial capital across national boundaries either as portfolio investment or direct investment

merged currency
when a nation chooses to use another nation's currency

portfolio investment
an investment in another country that is purely financial and does not involve any management responsibility

purchasing power parity (PPP)
the exchange rate that equalizes the prices of internationally traded goods across countries

soft peg
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

Tobin taxes
see international capital flows

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15.7: Key Concepts and Summary

16.1 How the Foreign Exchange Market Works

In the foreign exchange market, people and firms exchange one currency to purchase another currency. 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. When currency A can buy more of currency B, then currency A has strengthened or appreciated relative to B. When currency A can buy less of currency B, then currency A has weakened or depreciated relative to B. If currency A strengthens or appreciates relative to currency B, then currency B must necessarily weaken or depreciate with regard to currency A. A stronger currency benefits those who are buying with that currency and injures those who are selling. A weaker currency injures those, like importers, who are buying with that currency and benefits those who are selling with it, like exporters.

16.2 Demand and Supply Shifts in Foreign Exchange Markets

In the extreme short run, ranging from a few minutes to a few weeks, speculators who are trying to invest in currencies that will grow stronger, and to sell currencies that will grow weaker influence exchange rates. Such speculation can create a self-fulfilling prophecy, at least for a time, where an expected appreciation leads to a stronger currency and vice versa. In the relatively short run, differences in rates of return influence exchange rate markets. Countries with relatively high real rates of return (for example, high interest rates) will tend to experience stronger currencies as they attract money from abroad, while countries with relatively low rates of return will tend to experience weaker exchange rates as investors convert to other currencies.

In the medium run of a few months or a few years, inflation rates influence exchange rate markets. Countries with relatively high inflation will tend to experience less demand for their currency than countries with lower inflation, and thus currency depreciation. Over long periods of many years, exchange rates tend to adjust toward the purchasing power parity (PPP) rate, which is the exchange rate such that the prices of internationally tradable goods in different countries, when converted at the PPP exchange rate to a common currency, are similar in all economies.

16.3 Macroeconomic Effects of Exchange Rates

A central bank will be concerned about the exchange rate for several reasons. Exchange rates will affect imports and exports, and thus affect aggregate demand in the economy. Fluctuations in exchange rates may cause difficulties for many firms, but especially banks. The exchange rate may accompany unsustainable flows of international financial capital.

16.4 Exchange Rate Policies

In a floating exchange rate policy, a government determines its country’s exchange rate in the foreign exchange market. In a soft peg exchange rate policy, the foreign exchange market usually determines a country's exchange rate, but the government sometimes intervenes to strengthen or weaken it. In a hard peg exchange rate policy, the government chooses an exchange rate. A central bank can intervene in exchange markets in two ways. It can raise or lower interest rates to make the currency stronger or weaker. It also can directly purchase or sell its currency in foreign exchange markets. All exchange rates policies face tradeoffs. A hard peg exchange rate policy will reduce exchange rate fluctuations, but means that a country must focus its monetary policy on the exchange rate, not on fighting recession or controlling inflation. When a nation merges its currency with another nation, it gives up on nationally oriented monetary policy altogether.

A soft peg exchange rate may create additional volatility as exchange rate markets try to anticipate when and how the government will intervene. A flexible exchange rate policy allows monetary policy to focus on inflation and unemployment, and allows the exchange rate to change with inflation and rates of return, but also raises a risk that exchange rates may sometimes make large and abrupt movements. The spectrum of exchange rate policies includes: (a) a floating exchange rate, (b) a pegged exchange rate, soft or hard, and (c) a merged currency. Monetary policy can focus on a variety of goals: (a) inflation; (b) inflation or unemployment, depending on which is the most dangerous obstacle; and (c) a long-term rule based policy designed to keep the money supply stable and predictable.

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CHAPTER OVERVIEW

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16.4: Intra-industry Trade between Similar Economies

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16.1: Introduction to International Trade



Figure 20.1 Apple or Samsung iPhone? While the iPhone is readily recognized as an Apple product, many versions (including recently released offerings) have key 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 "iPhone 4's Retina Display v.s. iPhone 3G" by Yutaka Tsutano/Flickr Creative Commons, CC BY 2.0)

Chapter Objectives

In this chapter, you will learn about:

- Absolute and Comparative Advantage
- What Happens When a Country Has an Absolute Advantage in All Goods
- Intra-industry Trade between Similar Economies
- The Benefits of Reducing Barriers to International Trade

Bring It Home

Just Whose iPhone Is 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 factories in China and India. But, Samsung, the electronics firm and competitor to Apple, actually supplies many of the parts that make up an iPhone. In earlier models, Samsung parts made up as much as 26% of the total costs of production. And in more recent versions, Samsung manufactures the displays and cameras. In some ways, then, Samsung is both the biggest supplier and biggest competitor for Apple. Why do these two firms work together to produce the iPhone? 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.

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.

The first wave of globalization started in the nineteenth century and lasted up to the beginning of World War I. Over that time, global exports as a share of global GDP rose from less than 1% of GDP in 1820 to 9% of GDP in 1913. As the Nobel Prize-winning economist Paul Krugman of Princeton University wrote in 1995:

> *It is a late-twentieth-century conceit that we invented the global economy just yesterday. In fact, world markets achieved an impressive degree of integration during the second half of the nineteenth century. Indeed, if one wants a specific date for the beginning of a truly global economy, one might well choose 1869, the year in which both the Suez Canal and the Union Pacific railroad were completed. By the eve of the First World War steamships and railroads had created markets for standardized commodities, like wheat and wool, that were fully global in their reach. Even the global flow of information was better than modern observers, focused on electronic technology, tend to realize: the first submarine telegraph cable was laid under the Atlantic in 1858, and by 1900 all of the world's major economic regions could effectively communicate instantaneously.*

This first wave of globalization crashed to a halt early in the twentieth century. World War I severed many economic connections. During the Great Depression of the 1930s, many nations misguidedly tried to fix their own economies by reducing foreign trade with others. World War II further hindered international trade. Global flows of goods and financial capital were rebuilt only slowly after World War II. It was not until the early 1980s that global economic forces again became as important, relative to the size of the world economy, as they were before World War I.

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16.2: Absolute and Comparative Advantage

Learning Objectives

By the end of this section, you will be able to:

- Define absolute advantage, comparative advantage, and opportunity costs
- Explain the gains of trade created when a country specializes

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 several 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 in producing a good if it uses fewer resources to produce that good. 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 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." Chile will provide copper and Guatemala will produce coffee, and they will trade. When each country has a product others need and it can produce it with fewer resources in one country than in 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. Trade really occurs because of comparative advantage.

Recall from the chapter Choice in a World of Scarcity that a country has a comparative advantage when it can produce a good at a lower cost in terms of other goods. The question each country or company should be asking when it trades is this: "What do we give up to produce this good?" It should be no surprise that the concept of comparative advantage is based on this idea of opportunity cost from Choice in a World of Scarcity. For example, if Zambia focuses its resources on producing copper, it cannot use its labor, land and financial resources to produce other goods such as corn. As a result, Zambia gives up the opportunity to produce corn. How do we quantify the cost in terms of other goods? Simplify the problem and assume that Zambia just needs labor to produce copper and corn. The companies that produce either copper or corn tell you that it takes two hours to mine a ton of copper and one hour to harvest a bushel of corn. This means the opportunity cost of producing a ton of copper is two bushels of corn. The next section develops absolute and comparative advantage in greater detail and relates them to trade.

Link It Up

Visit this website for a list of articles and podcasts pertaining to international trade topics.

A Numerical Example of Absolute and Comparative Advantage

Consider a hypothetical world with two countries, Saudi Arabia and the United States, and two products, oil and corn. Further assume that consumers in both countries desire both these goods. These goods are homogeneous, meaning that consumers/producers cannot differentiate between corn or oil from either country. There is only one resource available in both countries, labor hours. Saudi Arabia can produce oil with fewer resources, while the United States can produce corn with fewer

resources. Table 20.1 illustrates the advantages of the two countries, expressed in terms of how many hours it takes to produce one unit of each good.

Country	Oil (hours per barrel)	Corn (hours per bushel)
Saudi Arabia	1	4
United States	2	1

Table 20.1 How Many Hours It Takes to Produce Oil and Corn

In Table 20.1, Saudi Arabia has an absolute advantage in producing oil because it only takes an hour to produce a barrel of oil compared to two hours in the United States. The United States has an absolute advantage in producing corn.

To simplify, let's say that Saudi Arabia and the United States each have 100 worker hours (see Table 20.2). Figure 20.2 illustrates what each country is capable of producing on its own using a production possibility frontier (PPF) graph. Recall from Choice in a World of Scarcity that the production possibilities frontier shows the maximum amount that each country can produce given its limited resources, in this case workers, and its level of technology.

Country	Oil Production using 100 worker hours (barrels)		Corn Production using 100 worker hours (bushels)
Saudi Arabia	100	or	25
United States	50	or	100

Table 20.2 Production Possibilities before Trade

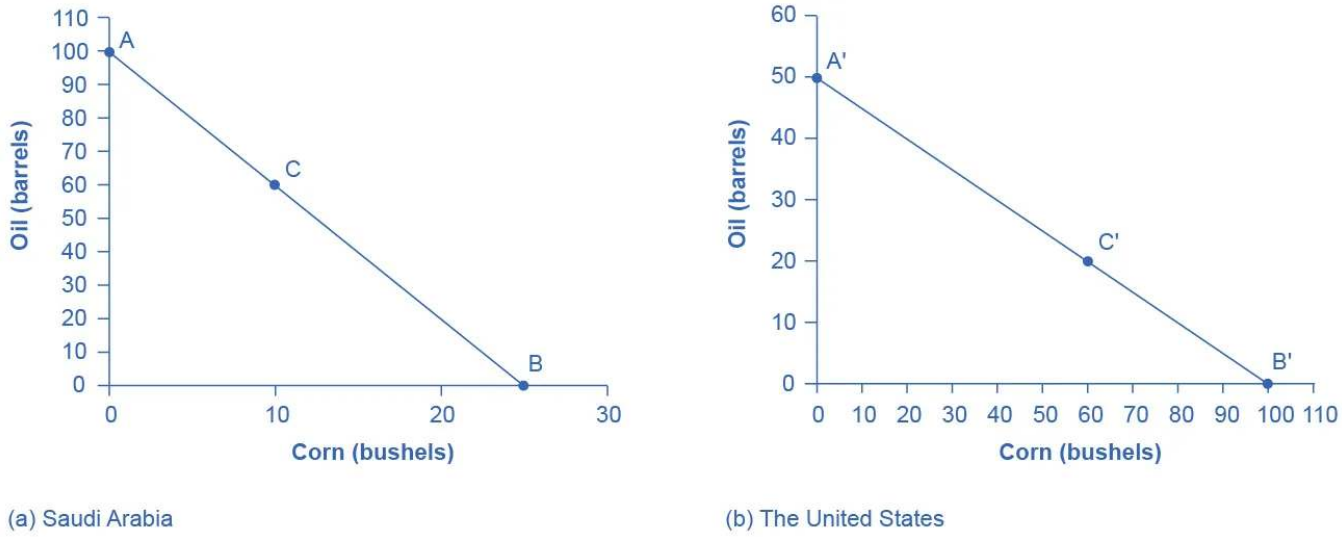


Figure 20.2 Production Possibilities Frontiers (a) Saudi Arabia can produce 100 barrels of oil at maximum and zero corn (point A), or 25 bushels of corn and zero oil (point B). It can also produce other combinations of oil and corn if it wants to consume both goods, such as at point C. Here it chooses to produce/consume 60 barrels of oil, leaving 40 work hours that to allocate to produce 10 bushels of corn, using the data in Table 20.1. (b) If the United States produces only oil, it can produce, at maximum, 50 barrels and zero corn (point A'), or at the other extreme, it can produce a maximum of 100 bushels of corn and no oil (point B'). Other combinations of both oil and corn are possible, such as point C'. All points above the frontiers are impossible to produce given the current level of resources and technology.

Arguably Saudi and U.S. consumers desire both oil and corn to live. Let's say that before trade occurs, both countries produce and consume at point C or C'. Thus, before trade, the Saudi Arabian economy will devote 60 worker hours to produce oil, as Table 20.3 shows. Given the information in Table 20.1, this choice implies that it produces/consumes 60 barrels of oil. With the remaining 40 worker hours, since it needs four hours to produce a bushel of corn, it can produce only 10 bushels. To be at point C', the U.S.

economy devotes 40 worker hours to produce 20 barrels of oil and it can allocate the remaining worker hours to produce 60 bushels of corn.

Country	Oil Production (barrels)	Corn Production (bushels)
Saudi Arabia (C)	60	10
United States (C')	20	60
Total World Production	**80**	**70**

Table 20.3 Production before Trade

The slope of the production possibility frontier illustrates the opportunity cost of producing oil in terms of corn. Using all its resources, the United States can produce 50 barrels of oil *or* 100 bushels of corn; therefore, the opportunity cost of one barrel of oil is two bushels of corn—or the slope is 1/2. Thus, in the U.S. production possibility frontier graph, every increase in oil production of one barrel implies a decrease of two bushels of corn. Saudi Arabia can produce 100 barrels of oil *or* 25 bushels of corn. The opportunity cost of producing one barrel of oil is the loss of 1/4 of a bushel of corn that Saudi workers could otherwise have produced. In terms of corn, notice that Saudi Arabia gives up the least to produce a barrel of oil. Table 20.4 summarizes these calculations.

Country	Opportunity cost of one unit — Oil (in terms of corn)	Opportunity cost of one unit — Corn (in terms of oil)
Saudi Arabia	¼	4
United States	2	½

Table 20.4 Opportunity Cost and Comparative Advantage

Again recall that we defined comparative advantage as the opportunity cost of producing goods. Since Saudi Arabia gives up the least to produce a barrel of oil, (1414 < 22 in Table 20.4) it has a comparative advantage in oil production. The United States gives up the least to produce a bushel of corn, so it has a comparative advantage in corn production.

In this example, there is symmetry between absolute and comparative advantage. Saudi Arabia needs fewer worker hours to produce oil (absolute advantage, see Table 20.1), and also gives up the least in terms of other goods to produce oil (comparative advantage, see Table 20.4). Such symmetry is not always the case, as we will show after we have discussed gains from trade fully, but first, read the following Clear It Up feature to make sure you understand why the PPF line in the graphs is straight.

Clear It Up

Can a production possibility frontier be straight?

When you first met the production possibility frontier (PPF) in the chapter on Choice in a World of Scarcity we drew it with an outward-bending shape. This shape illustrated that as we transferred inputs from producing one good to another—like from education to health services—there were increasing opportunity costs. In the examples in this chapter, we draw the PPFs as straight lines, which means that opportunity costs are constant. When we transfer a marginal unit of labor 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.

Gains from Trade

Consider the trading positions of the United States and Saudi Arabia after they have specialized and traded. Before trade, Saudi Arabia produces/consumes 60 barrels of oil and 10 bushels of corn. The United States produces/consumes 20 barrels of oil and 60 bushels of corn. Given their current production levels, if the United States can trade an amount of corn fewer than 60 bushels and

receive in exchange an amount of oil greater than 20 barrels, it will gain from trade. With trade, the United States can consume more of both goods than it did without specialization and trade. (Recall that the chapter Welcome to Economics! defined specialization as it applies to workers and firms. Economists also use specialization to describe the occurrence when a country shifts resources to focus on producing a good that offers comparative advantage.) Similarly, if Saudi Arabia can trade an amount of oil less than 60 barrels and receive in exchange an amount of corn greater than 10 bushels, it will have more of both goods than it did before specialization and trade. Table 20.5 illustrates the range of trades that would benefit both sides.

The U.S. economy, after specialization, will benefit if it:	The Saudi Arabian economy, after specialization, will benefit if it:
Exports no more than 60 bushels of corn	Imports at least 10 bushels of corn
Imports at least 20 barrels of oil	Exports less than 60 barrels of oil

Table 20.5 The Range of Trades That Benefit Both the United States and Saudi Arabia

The underlying reason why trade benefits both sides is rooted in the concept of opportunity cost, as the following Clear It Up feature explains. If Saudi Arabia wishes to expand domestic production of corn in a world without international trade, then based on its opportunity costs it must give up four barrels of oil for every one additional bushel of corn. If Saudi Arabia could find a way to give up less than four barrels of oil for an additional bushel of corn (or equivalently, to receive more than one bushel of corn for four barrels of oil), it would be better off.

Clear It Up

What are the opportunity costs and gains from trade?

The range of trades that will benefit each country is based on the country's opportunity cost of producing each good. The United States can produce 100 bushels of corn or 50 barrels of oil. For the United States, the opportunity cost of producing one barrel of oil is two bushels of corn. If we divide the numbers above by 50, we get the same ratio: one barrel of oil is equivalent to two bushels of corn, or (100/50 = 2 and 50/50 = 1). In a trade with Saudi Arabia, if the United States is going to give up 100 bushels of corn in exports, it must import at least 50 barrels of oil to be just as well off. Clearly, to gain from trade it needs to be able to gain more than a half barrel of oil for its bushel of corn—or why trade at all?

Recall that David Ricardo argued that if each country specializes in its comparative advantage, it will benefit from trade, and total global output will increase. How can we show gains from trade as a result of comparative advantage and specialization? Table 20.6 shows the output assuming that each country specializes in its comparative advantage and produces no other good. This is 100% specialization. Specialization leads to an increase in total world production. (Compare the total world production in Table 20.3 to that in Table 20.6.)

Country	Quantity produced after 100% specialization — Oil (barrels)	Quantity produced after 100% specialization — Corn (bushels)
Saudi Arabia	100	0
United States	0	100
Total World Production	**100**	**100**

Table 20.6 How Specialization Expands Output

What if we did not have complete specialization, as in Table 20.6? Would there still be gains from trade? Consider another example, such as when the United States and Saudi Arabia start at C and C', respectively, as Figure 20.2 shows. Consider what occurs when trade is allowed and the United States exports 20 bushels of corn to Saudi Arabia in exchange for 20 barrels of oil.

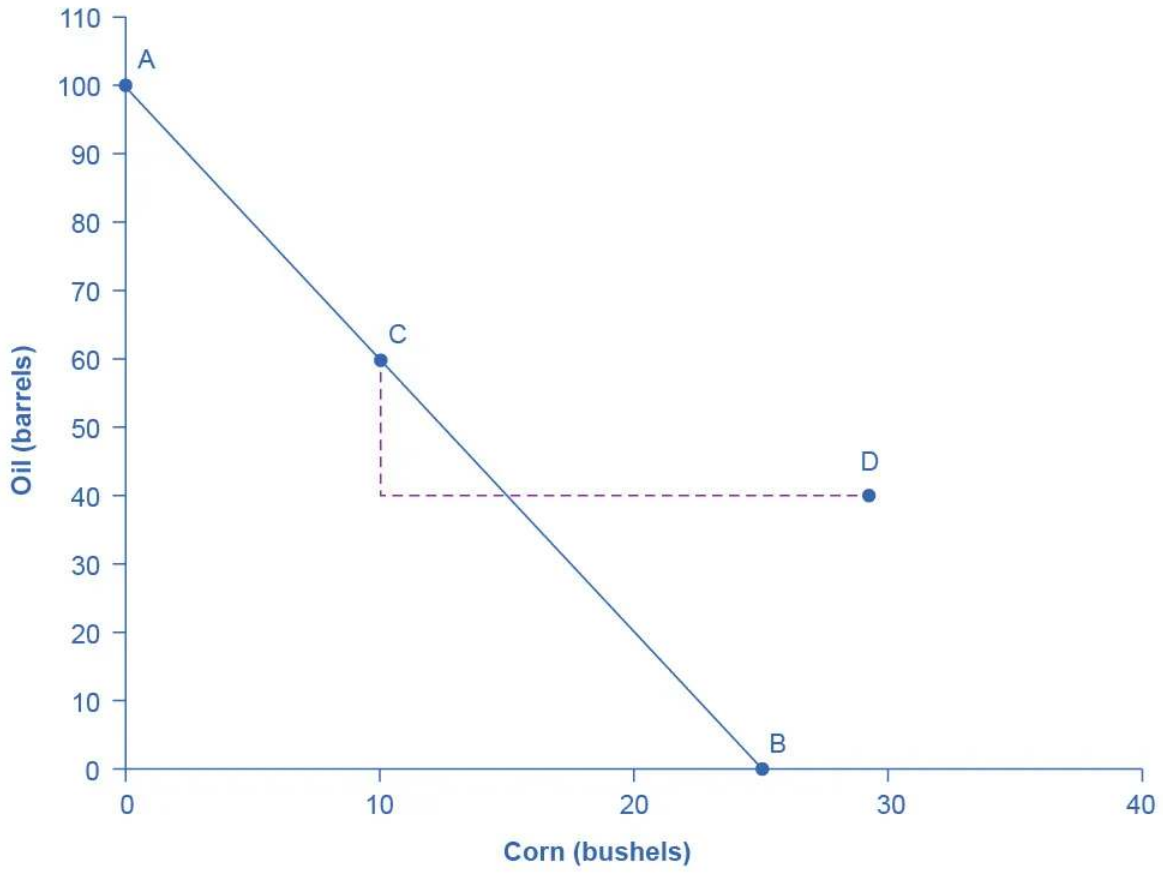


Figure 20.3 Production Possibilities Frontier in Saudi Arabia Trade allows a country to go beyond its domestic production-possibility frontier

Starting at point C, which shows Saudi oil production of 60, reduce Saudi oil domestic oil consumption by 20, since 20 is exported to the United States and exchanged for 20 units of corn. This enables Saudi to reach point D, where oil consumption is now 40 barrels and corn consumption has increased to 30 (see Figure 20.3). Notice that even without 100% specialization, if the "trading price," in this case 20 barrels of oil for 20 bushels of corn, is greater than the country's opportunity cost, the Saudis will gain from trade. Since the post-trade consumption point D is beyond its production possibility frontier, Saudi Arabia has gained from trade.

Link It Up

Visit this website for trade-related data visualizations.

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16.3: What Happens When a Country Has an Absolute Advantage in All Goods

Learning Objectives

By the end of this section, you will be able to:

- Show the relationship between production costs and comparative advantage
- Identify situations of mutually beneficial trade
- Identify trade benefits by considering opportunity costs

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.

Production Possibilities and Comparative Advantage

Consider the example of trade between the United States and Mexico described in Table 20.7. In this example, 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 productivity with regard to 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.

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

Table 20.7 Resources Needed to Produce Shoes and Refrigerators

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. Again, the production possibility frontier is a useful tool to visualize this benefit.

Consider a situation where the United States and Mexico each have 40 workers. For example, as Table 20.8 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.

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

Table 20.8 Production Possibilities before Trade with Complete Specialization

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 20.4).

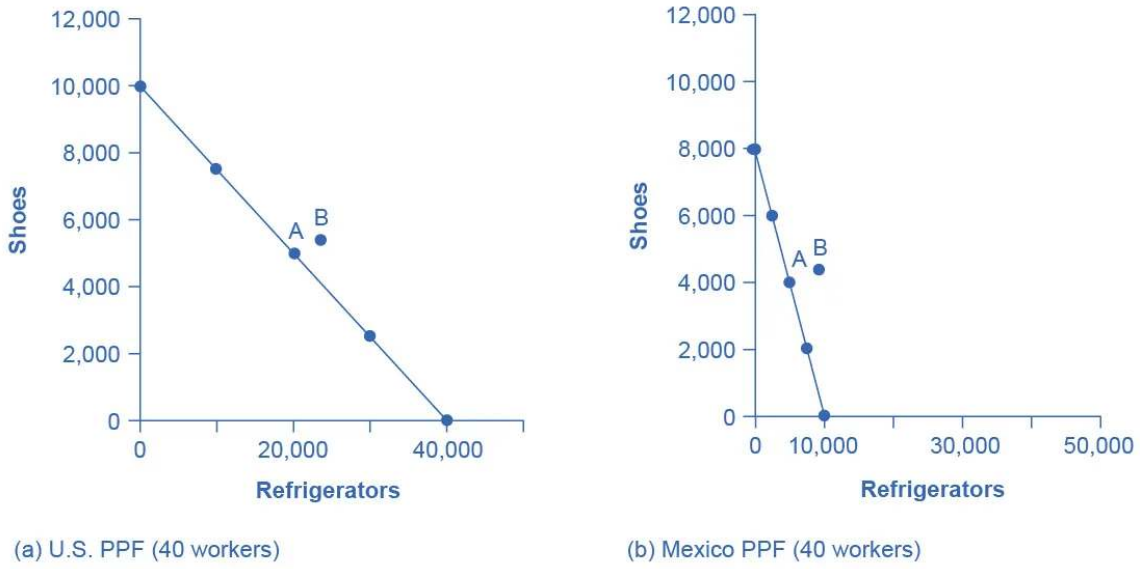


Figure 20.4 Production Possibility Frontiers (a) With 40 workers, the United States can produce either 10,000 shoes and zero refrigerators or 40,000 refrigerators and zero shoes. (b) With 40 workers, Mexico can produce a maximum of 8,000 shoes and zero refrigerators, or 10,000 refrigerators and zero 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 20.9 shows the output of each good for each country and the total output for the two countries.

Country	Current Shoe Production	Current Refrigerator Production
United States	5,000	20,000
Mexico	4,000	5,000
Total	**9,000**	**25,000**

Table 20.9 Total Production at Point A before Trade

Continuing with this scenario, suppose that 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 20.10. 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.

Country	Shoe Production	Refrigerator Production
United States	3,500	26,000
Mexico	6,000	2,500
Total	**9,500**	**28,500**

Table 20.10 Shifting Production Toward Comparative Advantage Raises Total Output

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.

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 (see Figure 20.4 and Table 20.9). 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 20.11. 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.

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

Table 20.11 The Range of Trades That Benefit Both the United States and Mexico

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 Work It Out feature shows how to calculate absolute and comparative advantage and the way to apply them to a country's production.

Work It Out

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.

Country	Oil (barrels)		Lumber (tons)
Canada	20	or	40
Venezuela	60	or	30

Table 20.12

a. Who has the absolute advantage in the production of oil or lumber? How can you tell?
b. Which country has a comparative advantage in the production of oil?
c. Which country has a comparative advantage in producing lumber?
d. In this example, is absolute advantage the same as comparative advantage, or not?
e. In what product should Canada specialize? In what product should Venezuela specialize?

Step 1. Make a table like Table 20.12.

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 the commodity for which 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.

Comparative Advantage Goes Camping

To build an intuitive understanding of how comparative advantage can benefit all parties, set aside examples that involve national economies for a moment and consider the situation of a group of friends who decide to go camping together. The six friends have a wide range of skills and experiences, but one person in particular, Jethro, has done lots of camping before and is also a great athlete. Jethro has an absolute advantage in all aspects of camping: he is faster at carrying a backpack, gathering firewood, paddling a canoe, setting up tents, making a meal, and washing up. So here is the question: Because Jethro has an absolute productivity advantage in everything, should he do all the work?

Of course not! Even if Jethro is willing to work like a mule while everyone else sits around, he, like all mortals, only has 24 hours in a day. If everyone sits around and waits for Jethro to do everything, not only will Jethro be an unhappy camper, but there will not be much output for his group of six friends to consume. The theory of comparative advantage suggests that everyone will benefit if they figure out their areas of comparative advantage—that is, the area of camping where their productivity disadvantage is least, compared to Jethro. For example, it may be that Jethro is 80% faster at building fires and cooking meals than anyone else, but only 20% faster at gathering firewood and 10% faster at setting up tents. In that case, Jethro should focus on building fires and making meals, and others should attend to the other tasks, each according to where their productivity disadvantage is smallest. If the campers coordinate their efforts according to comparative advantage, they can all gain.

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16.4: Intra-industry Trade between Similar Economies

Learning Objectives

By the end of this section, you will be able to:

- 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 chapter, 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 U.S. trade involves shipping goods between the fairly similar high-income economies of Japan, Canada, and the United States. Furthermore, the trade has an important geographic component—the biggest trading partners of the United States are Canada and Mexico (see Table 20.13).

Country	U.S. Exports Go to ...	U.S. Imports Come from ...
China	8.6%	17.7%
Canada	17.6%	12.6%
Japan	4.3%	4.3%
Mexico	15.8%	13.6%
South Korea	3.8%	3.3%

Table 20.13 Top Trading Partners (November 2021) (Source: https://www.census.gov/foreign-trade...ppartners.html)

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 20.14 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 2021, according to the U.S. Census Bureau, the United States exported $131 billion worth of autos, and imported $317 billion worth of autos. About 60% of U.S. trade and 60% of European trade is intra-industry trade.

Some U.S. Exports	Quantity of Exports ($ billions)	Quantity of Imports ($ billions)
Autos	$131	$317
Food and beverages	$147	$167
Capital goods	$474	$695
Consumer goods	$201	$699
Industrial supplies	$578	$589
Other transportation	$63	$113

Table 20.14 Some Intra-Industry U.S. Exports and Imports in 2021 (Source: https://www.census.gov/foreign-trade/data/index.html)

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.

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, which economists call splitting up the value chain. The value chain describes how a good is produced in stages. As indicated in the beginning of the chapter, producing the iPhone involves designing and engineering the phone in the United States, supplying parts from Korea, assembling the parts in China, and advertising and marketing 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, different firms operating in various places and even different countries can divide the value chain. Because firms split up the value chain, international trade often does not involve nations trading whole finished products like automobiles or refrigerators. 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.

Link It Up

Visit this website for some interesting information about the assembly of the iPhone.

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, as we introduced in Production, Costs and Industry Structure, means that as the scale of output goes up, average costs of production decline—at least up to a point. Figure 20.5 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 its 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.

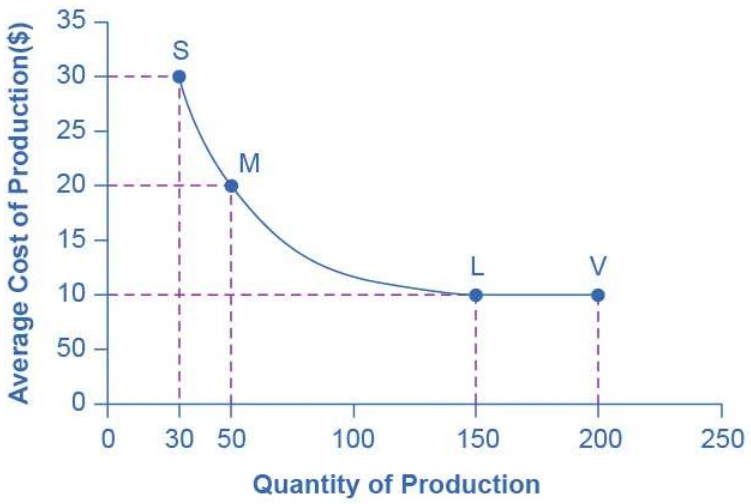


Figure 20.5 Economies of Scale Production Plant S, has an average cost of production of $30 per toaster oven. Production plant M has an average cost of production of $20 per toaster oven. Production plant L has an average cost of production of only $10 per toaster oven. Production plant V still has an 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 consumers purchase 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 General Motors, Ford, and Chrysler were the only players in the U.S. automobile market, the level of competition and consumer choice would be considerably 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.

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, climate or geography do not determine the level of worker productivity. Even the general level of education or skill does not determine it. Instead, how firms engage in specific learning about specialized products, including taking advantage of economies of scale determine the level of worker productivity. In this vision, comparative advantage can be dynamic—that is, it can evolve and change over time as one develops new skills and as manufacturers split the value chain 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.

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16.5: The Benefits of Reducing Barriers to International Trade

Learning Objectives

By the end of this section, you will be able to:

- Explain tariffs as barriers to trade
- Identify at least two benefits of reducing barriers to international trade

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 used simply as a political tool to protect certain vested economic, social, and cultural interests. The World Trade Organization (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 2010, the WTO noted that the Doha Round's emphasis on market access and reforms of agricultural subsidies could add $121–$202 billion to the world economy.

In the context of a global economy that currently produces more than $80 trillion of goods and services each year, this amount is not large: it is an increase of less than 1%. 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.

Link It Up

Visit this website for a list of some benefits of trade.

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. Earlier we explained that 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. This chapter has only made the case that trade brings economic benefits. Other chapters discuss, in detail, the public policy arguments over whether to restrict international trade.

Bring It Home

Just Whose iPhone Is 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.

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16.6: Key Terms

absolute advantage
: 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

gain from trade
: a country that can consume more than it can produce as a result of specialization and trade

intra-industry trade
: international trade of goods within the same industry

splitting up the value chain
: many of the different stages of producing a good happen in different geographic locations

tariffs
: taxes that governments place on imported goods

value chain
: how a good is produced in stages

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16.7: Key Concepts and Summary

20.1 Absolute and Comparative Advantage

A country has an absolute advantage in those products in which it has a productivity edge over other countries; it takes fewer resources to produce a product. A country has a comparative advantage when it can produce a good at a lower cost in terms of other goods. Countries that specialize based on comparative advantage gain from trade.

20.2 What Happens When a Country Has an Absolute Advantage in All Goods

Even when a country has high levels of productivity in all goods, it can still benefit from trade. Gains from trade come about as a result of comparative advantage. By specializing in a good that it gives up the least to produce, a country can produce more and offer that additional output for sale. If other countries specialize in the area of their comparative advantage as well and trade, the highly productive country is able to benefit from a lower opportunity cost of production in other countries.

20.3 Intra-industry Trade between Similar Economies

A large share of global trade happens between high-income economies that are quite similar in having well-educated workers and advanced technology. These countries practice intra-industry trade, in which they import and export the same products at the same time, like cars, machinery, and computers. In the case of intra-industry trade between economies with similar income levels, the gains from trade come from specialized learning in very particular tasks and from economies of scale. Splitting up the value chain means that several stages of producing a good take place in different countries around the world.

20.4 The Benefits of Reducing Barriers to International Trade

Tariffs are placed on imported goods as a way of protecting sensitive industries, for humanitarian reasons, and for protection against dumping. Traditionally, tariffs were used as a political tool to protect certain vested economic, social, and cultural interests. The WTO has been, and continues to be, a way for nations to meet and negotiate in order to reduce barriers to trade. The gains of international trade are very large, especially for smaller countries, but are beneficial to all.

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