

PART ONE

Basic Concepts



The Central Concepts of Economics



The Age of Chivalry is gone; that of sophisters, economists, and calculators has succeeded.

Edmund Burke

A. WHY STUDY ECONOMICS?

As you open this textbook, you may be wondering, Why should I study economics? Let us count the ways.

Many study economics to help them get a good job.

Some people feel they should understand more deeply what lies behind reports on inflation and unemployment.

Or people want to understand what kinds of policies might slow global warming or what it means to say an iPod is “made in China.”

For Whom the Bell Tolls

All these reasons, and many more, make good sense. Still, as we have come to realize, there is one overriding reason to learn the basic lessons of economics: All your life—from cradle to grave and beyond—you will run up against the brutal truths of economics.

As a voter, you will make decisions on issues that cannot be understood until you have mastered the rudiments of this subject. Without studying economics, you cannot be fully informed about international trade, tax policy, or the causes of recessions and high unemployment.

Choosing your life’s occupation is the most important economic decision you will make. Your future depends not only on your own abilities but also on how national and regional economic forces affect your wages. Also, your knowledge of economics can help you make wise decisions about how to buy a home, pay for your children’s education, and set aside a nest egg for retirement. Of course, studying economics will not make you a genius. But without economics the dice of life are loaded against you.

There is no need to belabor the point. We hope you will find that, in addition to being useful, economics is even a fascinating field. Generations of students, often to their surprise, have discovered how stimulating it is to look beneath the surface and understand the fundamental laws of economics.

SCARCITY AND EFFICIENCY: THE TWIN THEMES OF ECONOMICS

Definitions of Economics

Let us begin with a definition of economics. Over the last half-century, the study of economics has expanded to include a vast range of topics. Here are

some of the major subjects that are covered in this book:¹

- Economics explores the behavior of the financial markets, including interest rates, exchange rates, and stock prices.
- The subject examines the reasons why some people or countries have high incomes while others are poor; it goes on to analyze ways that poverty can be reduced without harming the economy.
- It studies business cycles—the fluctuations in credit, unemployment, and inflation—along with policies to moderate them.
- Economics studies international trade and finance and the impacts of globalization, and it particularly examines the thorny issues involved in opening up borders to free trade.
- It asks how government policies can be used to pursue important goals such as rapid economic growth, efficient use of resources, full employment, price stability, and a fair distribution of income.

This is a long list, but we could extend it many times. However, if we boil down all these definitions, we find one common theme:

Economics is the study of how societies use scarce resources to produce valuable goods and services and distribute them among different individuals.

Scarcity and Efficiency

If we think about the definitions, we find two key ideas that run through all of economics: that goods are scarce and that society must use its resources efficiently. *Indeed, the concerns of economics will not go away because of the fact of scarcity and the desire for efficiency.*

Consider a world without scarcity. If infinite quantities of every good could be produced or if human desires were fully satisfied, what would be the consequences? People would not worry about stretching out their limited incomes because they could have everything they wanted; businesses would not need to

fret over the cost of labor or health care; governments would not need to struggle over taxes or spending or pollution because nobody would care. Moreover, since all of us could have as much as we pleased, no one would be concerned about the distribution of incomes among different people or classes.

In such an Eden of affluence, all goods would be free, like sand in the desert or seawater at the beach. All prices would be zero, and markets would be unnecessary. Indeed, economics would no longer be a useful subject.

But no society has reached a utopia of limitless possibilities. Ours is a world of **scarcity**, full of **economic goods**. A situation of scarcity is one in which goods are limited relative to desires. An objective observer would have to agree that, even after two centuries of rapid economic growth, production in the United States is simply not high enough to meet everyone's desires. If you add up all the wants, you quickly find that there are simply not enough goods and services to satisfy even a small fraction of everyone's consumption desires. Our national output would have to be many times larger before the average American could live at the level of the average doctor or major-league baseball player. Moreover, outside the United States, particularly in Africa, hundreds of millions of people suffer from hunger and material deprivation.

Given unlimited wants, it is important that an economy make the best use of its limited resources. That brings us to the critical notion of efficiency. **Efficiency** denotes the most effective use of a society's resources in satisfying people's wants and needs. By contrast, consider an economy with unchecked monopolies or unhealthy pollution or government corruption. Such an economy may produce less than would be possible without these factors, or it may produce a distorted bundle of goods that leaves consumers worse off than they otherwise could be—either situation is an inefficient allocation of resources.

Economic efficiency requires that an economy produce the highest combination of quantity and quality of goods and services given its technology and scarce resources. An economy is producing efficiently when no individual's economic welfare can be improved unless someone else is made worse off.

The essence of economics is to acknowledge the reality of scarcity and then figure out how to organize

¹ This list contains several specialized terms that you will need to understand. If you are not familiar with a particular word or phrase, you should consult the Glossary at the back of this book. The Glossary contains most of the major technical economic terms used in this book. All terms printed in boldface are defined in the Glossary.

society in a way which produces the most efficient use of resources. That is where economics makes its unique contribution.

Microeconomics and Macroeconomics

Economics is today divided into two major subfields, microeconomics and macroeconomics. Adam Smith is usually considered the founder of **microeconomics**, the branch of economics which today is concerned with the behavior of individual entities such as markets, firms, and households. In *The Wealth of Nations* (1776), Smith considered how individual prices are set, studied the determination of prices of land, labor, and capital, and inquired into the strengths and weaknesses of the market mechanism. Most important, he identified the remarkable efficiency properties of markets and explained how the self-interest of individuals working through the competitive market can produce a societal economic benefit. Microeconomics today has moved beyond the early concerns to include the study of monopoly, the role of international trade, finance, and many other vital subjects.

The other major branch of our subject is **macroeconomics**, which is concerned with the overall performance of the economy. Macroeconomics did not even exist in its modern form until 1936, when John Maynard Keynes published his revolutionary *General Theory of Employment, Interest and Money*. At the time, England and the United States were still stuck in the Great Depression of the 1930s, with over one-quarter of the American labor force unemployed. In his new theory Keynes developed an analysis of what causes business cycles, with alternating spells of high unemployment and high inflation. Today, macroeconomics examines a wide variety of areas, such as how total investment and consumption are determined, how central banks manage money and interest rates, what causes international financial crises, and why some nations grow rapidly while others stagnate. Although macroeconomics has progressed far since his first insights, the issues addressed by Keynes still define the study of macroeconomics today.

THE LOGIC OF ECONOMICS

Economic life is an enormously complicated hive of activity, with people buying, selling, bargaining, investing, and persuading. The ultimate purpose of

economic science and of this text is to understand this complex undertaking. How do economists go about their task?

Economists use the *scientific approach* to understand economic life. This involves observing economic affairs and drawing upon statistics and the historical record. For complex phenomena like the impacts of budget deficits or the causes of inflation, historical research has provided a rich mine of insights.

Often, economics relies upon analyses and theories. Theoretical approaches allow economists to make broad generalizations, such as those concerning the advantages of international trade and specialization or the disadvantages of tariffs and quotas.

In addition, economists have developed a specialized technique known as *econometrics*, which applies the tools of statistics to economic problems. Using econometrics, economists can sift through mountains of data to extract simple relationships.

Budding economists must also be alert to common fallacies in economic reasoning. Because economic relationships are often complex, involving many different variables, it is easy to become confused about the exact reason behind events or the impact of policies on the economy. The following are some of the common fallacies encountered in economic reasoning:

- **The *post hoc fallacy*.** The first fallacy involves the inference of causality. *The post hoc fallacy occurs when we assume that, because one event occurred before another event, the first event caused the second event.*² An example of this syndrome occurred in the Great Depression of the 1930s in the United States. Some people had observed that periods of business expansion were preceded or accompanied by rising prices. From this, they concluded that the appropriate remedy for depression was to raise wages and prices. This idea led to a host of legislation and regulations to prop up wages and prices in an inefficient manner. Did these measures promote economic recovery? Almost surely not. Indeed, they probably slowed recovery, which did not occur until total spending began to rise as the government increased military spending in preparation for World War II.

² “Post hoc” is shorthand for *post hoc, ergo propter hoc*. Translated from the Latin, the full expression means “after this, therefore necessarily because of this.”

- *Failure to hold other things constant.* A second pitfall is failure to hold other things constant when thinking about an issue. For example, we might want to know whether raising tax rates will raise or lower tax revenues. Some people have put forth the seductive argument that we can eat our fiscal cake and have it too. They argue that cutting tax rates will at the same time raise government revenues and lower the budget deficit. They point to the Kennedy-Johnson tax cuts of 1964, which lowered tax rates sharply and were followed by an increase in government revenues in 1965. Hence, they argue, lower tax rates produce higher revenues.

Why is this reasoning fallacious? The argument assumes that other things were constant—in particular, it overlooked the growth in the overall economy from 1964 to 1965. Because people's incomes grew during that period, total tax revenues grew even though tax rates were lower. Careful econometric studies indicate that total tax revenues would have been *even higher* in 1965 if tax rates had been held at the same level as in 1964. Hence, this analysis fails to hold other things constant in making the calculations.

Remember to hold other things constant when you are analyzing the impact of a variable on the economic system.

- *The fallacy of composition.* Sometimes we assume that what holds true for part of a system also holds true for the whole. In economics, however, we often find that the whole is different from the sum of the parts. *When you assume that what is true for the part is also true for the whole, you are committing the fallacy of composition.*

Here are some true statements that might surprise you if you ignored the fallacy of composition: (1) If one farmer has a bumper crop, she has a higher income; if all farmers produce a record crop, farm incomes will fall. (2) If one person receives a great deal more money, that person will be better off; if everyone receives a great deal more money, the society is likely to be worse off. (3) If a high tariff is put on a product such as shoes or steel, the producers in that industry are likely to profit; if high tariffs are put on all products, the economic welfare of the nation is likely to be worse off.

These examples contain no tricks or magic. Rather, they are the results of systems of interacting

individuals. Often the behavior of the aggregate looks very different from the behavior of individual people.

We mention these fallacies only briefly in this introduction. Later, as we introduce the tools of economics, we will provide examples of how inattention to the logic of economics can lead to false and sometimes costly errors. When you reach the end of this book, you can look back to see why each of these paradoxical examples is true.



Positive Economics versus Normative Economics

When considering economic issues, we must carefully distinguish questions of fact from questions of fairness. Positive economics describes the facts of an economy, while normative economics involves value judgments.

Positive economics deals with questions such as: Why do doctors earn more than janitors? Did the North American Free Trade Agreement (NAFTA) raise or lower the incomes of most Americans? Do higher interest rates slow the economy and lower inflation? Although these may be difficult questions to answer, they can all be resolved by reference to analysis and empirical evidence. That puts them in the realm of positive economics.

Normative economics involves ethical precepts and norms of fairness. Should unemployment be raised to ensure that price inflation does not become too rapid? Should the United States negotiate further agreements to lower tariffs on imports? Has the distribution of income in the United States become too unequal? There are no right or wrong answers to these questions because they involve ethics and values rather than facts. While economic analysis can *inform* these debates by examining the likely consequences of alternative policies, the answers can be resolved only by discussions and debates over society's fundamental values.

COOL HEADS AT THE SERVICE OF WARM HEARTS

Economics has, over the last century, grown from a tiny acorn into a mighty oak. Under its spreading branches we find explanations of the gains from international trade, advice on how to reduce

unemployment and inflation, formulas for investing your retirement funds, and proposals to auction limited carbon dioxide emissions permits to help slow global warming. Throughout the world, economists are laboring to collect data and improve our understanding of economic trends.

You might well ask, What is the purpose of this army of economists measuring, analyzing, and calculating? *The ultimate goal of economic science is to improve the living conditions of people in their everyday lives.* Increasing the gross domestic product is not just a numbers game. Higher incomes mean good food, warm houses, and hot water. They mean safe drinking water and inoculations against the perennial plagues of humanity.

Higher incomes produce more than food and shelter. Rich countries have the resources to build schools so that young people can learn to read and develop the skills necessary to use modern machinery and computers. As incomes rise further, nations can afford scientific research to determine agricultural techniques appropriate for a country's climate and soils or to develop vaccines against local diseases. With the resources freed up by economic growth, people have free time for artistic pursuits, such as poetry and music, and the population has the leisure time to read, to listen, and to perform. Although there is no single pattern of economic development, and cultures differ around the world, freedom from hunger, disease, and the elements is a universal human goal.

But centuries of human history also show that warm hearts alone will not feed the hungry or heal the sick. A free and efficient market will not necessarily produce a distribution of income that is socially acceptable. Determining the best route to economic progress or an equitable distribution of society's output requires cool heads that objectively weigh the costs and benefits of different approaches, trying as hard as humanly possible to keep the analysis free from the taint of wishful thinking. Sometimes, economic progress will require shutting down an outmoded factory. Sometimes, as when centrally planned countries adopted market principles, things get worse before they get better. Choices are particularly difficult in the field of health care, where limited resources literally involve life and death.

You may have heard the saying, "From each according to his ability, to each according to his need." Governments have learned that no society can long operate solely on this utopian principle. To

maintain a healthy economy, governments must preserve incentives for people to work and to save.

Societies can support the unemployed for a while, but when unemployment insurance pays too much for too long, people may come to depend upon the government and stop looking for work. If they begin to believe that the government owes them a living, this may dull the cutting edge of enterprise. Just because government programs pursue lofty goals cannot exempt them from careful scrutiny and efficient management.

Society must strive to combine the discipline of the marketplace with the compassion of social programs. By using cool heads to inform warm hearts, economic science can do its part in finding the appropriate balance for an efficient, prosperous, and just society.

B. THE THREE PROBLEMS OF ECONOMIC ORGANIZATION

Every human society—whether it is an advanced industrial nation, a centrally planned economy, or an isolated tribal nation—must confront and resolve three fundamental economic problems. Every society must have a way of determining *what* commodities are produced, *how* these goods are made, and *for whom* they are produced.

Indeed, these three fundamental questions of economic organization—*what, how, and for whom*—are as crucial today as they were at the dawn of human civilization. Let's look more closely at them:

- *What* commodities are produced and in what quantities? A society must determine how much of each of the many possible goods and services it will make and when they will be produced. Will we produce pizzas or shirts today? A few high-quality shirts or many cheap shirts? Will we use scarce resources to produce many consumption goods (like pizzas)? Or will we produce fewer consumption goods and more investment goods (like pizza-making machines), which will boost production and consumption tomorrow?
- *How* are goods produced? A society must determine who will do the production, with what resources, and what production techniques they will use. Who farms and who teaches? Is electricity

generated from oil, from coal, or from the sun? Will factories be run by people or robots?

- *For whom* are goods produced? Who gets to eat the fruit of economic activity? Is the distribution of income and wealth fair and equitable? How is the national product divided among different households? Are many people poor and a few rich? Do high incomes go to teachers or athletes or autoworkers or venture capitalists? Will society provide minimal consumption to the poor, or must people work if they are to eat?

MARKET, COMMAND, AND MIXED ECONOMIES

What are the different ways that a society can answer the questions of *what*, *how*, and *for whom*? Different societies are organized through *alternative economic systems*, and economics studies the various mechanisms that a society can use to allocate its scarce resources.

We generally distinguish two fundamentally different ways of organizing an economy. At one extreme, government makes most economic decisions, with those on top of the hierarchy giving economic commands to those further down the ladder. At the other extreme, decisions are made in markets, where individuals or enterprises voluntarily agree to exchange goods and services, usually through payments of money. Let's briefly examine each of these two forms of economic organization.

In the United States, and increasingly around the world, most economic questions are settled by the market mechanism. Hence their economic systems are called market economies. A **market economy** is one in which individuals and private firms make the major decisions about production and consumption. A system of prices, of markets, of profits and losses, of incentives and rewards determines *what*, *how*, and *for whom*. Firms produce the commodities that yield the highest profits (the *what*) by the techniques of production that are least costly (the *how*). Consumption is determined by individuals' decisions about how to spend the wages and property incomes generated by their labor and property ownership (the *for whom*). The extreme case of a market economy, in which the government keeps its hands off economic decisions, is called a **laissez-faire** economy.

By contrast, a **command economy** is one in which the government makes all important decisions about production and distribution. In a command economy,

such as the one which operated in the Soviet Union during most of the twentieth century, the government owns most of the means of production (land and capital); it also owns and directs the operations of enterprises in most industries; it is the employer of most workers and tells them how to do their jobs; and it decides how the output of the society is to be divided among different goods and services. In short, in a command economy, the government answers the major economic questions through its ownership of resources and its power to enforce decisions.

No contemporary society falls completely into either of these polar categories. Rather, all societies are **mixed economies**, with elements of market and command.

Economic life is organized either through hierarchical command or decentralized voluntary markets. Today most decisions in the United States and other high-income economies are made in the marketplace. But the government plays an important role in overseeing the functioning of the market; governments pass laws that regulate economic life, produce educational and police services, and control pollution. Most societies today operate mixed economies.

C. SOCIETY'S TECHNOLOGICAL POSSIBILITIES

Every gun that is made, every warship launched, every rocket fired signifies, in the final sense, a theft from those who hunger and are not fed.

President Dwight D. Eisenhower

Each economy has a stock of limited resources—labor, technical knowledge, factories and tools, land, energy. In deciding *what* and *how* things should be produced, the economy is in reality deciding how to allocate its resources among the thousands of different possible commodities and services. How much land will go into growing wheat? Or into housing the population? How many factories will produce computers? How many will make pizzas? How many children will grow up to play professional sports or to be professional economists or to program computers?

Faced with the undeniable fact that goods are scarce relative to wants, an economy must decide

how to cope with limited resources. It must choose among different potential bundles of goods (the *what*), select from different techniques of production (the *how*), and decide in the end who will consume the goods (the *for whom*).

INPUTS AND OUTPUTS

To answer these three questions, every society must make choices about the economy's inputs and outputs. **Inputs** are commodities or services that are used to produce goods and services. An economy uses its existing technology to combine inputs to produce outputs. **Outputs** are the various useful goods or services that result from the production process and are either consumed or employed in further production. Consider the "production" of pizza. We say that the eggs, flour, heat, pizza oven, and chef's skilled labor are the inputs. The tasty pizza is the output. In education, the inputs are the time of the faculty and students, the laboratories and classrooms, the textbooks, and so on, while the outputs are informed, productive, and well-paid citizens.

Another term for inputs is **factors of production**. These can be classified into three broad categories: land, labor, and capital.

- *Land*—or, more generally, natural resources—represents the gift of nature to our societies. It consists of the land used for farming or for underpinning houses, factories, and roads; the energy resources that fuel our cars and heat our homes; and the nonenergy resources like copper and iron ore and sand. In today's congested world, we must broaden the scope of natural resources to include our environmental resources, such as clean air and drinkable water.
- *Labor* consists of the human time spent in production—working in automobile factories, writing software, teaching school, or baking pizzas. Thousands of occupations and tasks, at all skill levels, are performed by labor. It is at once the most familiar and the most crucial input for an advanced industrial economy.
- *Capital* resources form the durable goods of an economy, produced in order to produce yet other goods. Capital goods include machines, roads, computers, software, trucks, steel mills, automobiles, washing machines, and buildings. As we will see later, the accumulation of specialized capital goods is essential to the task of economic development.

Restating the three economic problems in these terms, society must decide (1) *what* outputs to produce, and in what quantity; (2) *how*, or with what inputs and techniques, to produce the desired outputs; and (3) *for whom* the outputs should be produced and distributed.

THE PRODUCTION-POSSIBILITY FRONTIER

We learn early in life that we can't have everything. "You can have chocolate or vanilla ice cream. No, not both," we might hear. Similarly, the consumption opportunities of countries are limited by the resources and the technologies available to them.

The need to choose among limited opportunities is dramatized during wartime. In debating whether the United States should invade Iraq in 2003, people wanted to know how much the war would cost. The administration said it would cost only \$50 billion, while some economists said it might cost as much as \$200 billion. These are not just mountains of dollar bills. These numbers represent resources diverted from other purchases. As the numbers began to climb, people naturally asked, Why are we policing Baghdad rather than New York, or repairing the electrical system in the Middle East rather than in the U.S. Midwest? People understand, as did former general and president Eisenhower, that when output is devoted to military tasks, there is less available for civilian consumption and investment.

Let us dramatize this choice by considering an economy which produces only two economic goods, guns and butter. The guns, of course, represent military spending, and the butter stands for civilian spending. Suppose that our economy decides to throw all its energy into producing the civilian good, butter. There is a maximum amount of butter that can be produced per year. The maximal amount of butter depends on the quantity and quality of the economy's resources and the productive efficiency with which they are used. Suppose 5 million pounds of butter is the maximum amount that can be produced with the existing technology and resources.

At the other extreme, imagine that all resources are instead devoted to the production of guns. Again, because of resource limitations, the economy can produce only a limited quantity of guns. For this example, assume that the economy can produce 15,000 guns of a certain kind if no butter is produced.

Alternative Production Possibilities		
Possibilities	Butter (millions of pounds)	Guns (thousands)
A	0	15
B	1	14
C	2	12
D	3	9
E	4	5
F	5	0

TABLE 1-1. Limitation of Scarce Resources Implies the Guns-Butter Tradeoff

Scarce inputs and technology imply that the production of guns and butter is limited. As we go from A to B . . . to F, we are transferring labor, machines, and land from the gun industry to butter and can thereby increase butter production.

These are two extreme possibilities. In between are many others. If we are willing to give up some butter, we can have some guns. If we are willing to give up still more butter, we can have still more guns.

A schedule of possibilities is given in Table 1-1. Combination F shows the extreme, where all butter and no guns are produced, while A depicts the opposite extreme, where all resources go into guns. In between—at E, D, C, and B—increasing amounts of butter are given up in return for more guns.

How, you might well ask, can a nation turn butter into guns? Butter is transformed into guns not physically but by the alchemy of diverting the economy's resources from one use to the other.

We can represent our economy's production possibilities more vividly in the diagram shown in Figure 1-1. This diagram measures butter along the horizontal axis and guns along the vertical one. (If you are unsure about the different kinds of graphs or about how to turn a table into a graph, consult the appendix to this chapter.) We plot point *F* in Figure 1-1 from the data in Table 1-1 by counting over 5 butter units to the right on the horizontal axis and going up 0 gun units on the vertical axis; similarly, *E* is obtained by going 4 butter units to the right and going up 5 gun units; and finally, we get *A* by going over 0 butter units and up 15 gun units.

If we fill in all intermediate positions with new green-colored points representing all the different

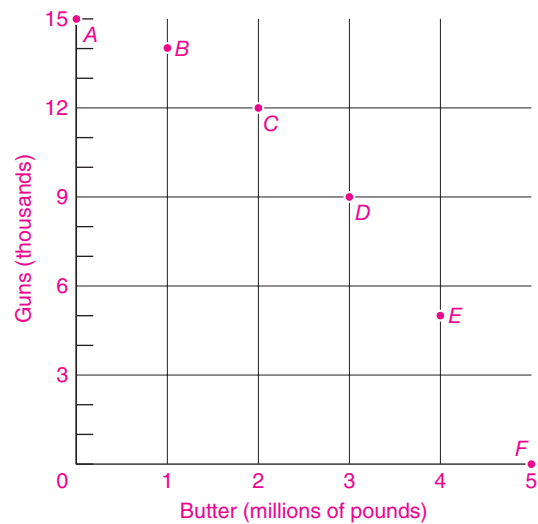


FIGURE 1-1. The Production Possibilities in a Graph

This figure displays the alternative combinations of production pairs from Table 1-1.

combinations of guns and butter, we have the continuous green curve shown as the *production-possibility frontier*, or *PPF*, in Figure 1-2.

The **production-possibility frontier** (or *PPF*) shows the maximum quantity of goods that can be efficiently produced by an economy, given its technological knowledge and the quantity of available inputs.

Applying the PPF to Society's Choices

The *PPF* is the menu of choices that an economy has to choose from. Figure 1-2 shows a choice between guns and butter, but this concept can be applied to a broad range of economic choices. Thus the more resources the government uses to spend on public highways, the less will be left to produce private goods like houses; the more we choose to consume of food, the less we can consume of clothing; the more an economy consumes today, the less can be its production of capital goods to turn out more consumption goods in the future.

The graphs in Figures 1-3 to 1-5 present some important applications of *PPFs*. Figure 1-3 shows the effect of economic growth on a country's production possibilities. An increase in inputs, or improved technological knowledge, enables a country to produce more of all goods and services, thus shifting

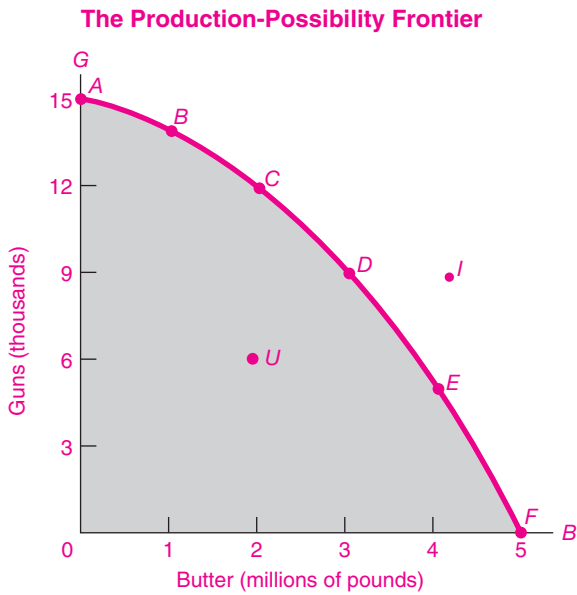


FIGURE 1-2. A Smooth Curve Connects the Plotted Points of the Numerical Production Possibilities

This frontier shows the schedule along which society can choose to substitute guns for butter. It assumes a given state of technology and a given quantity of inputs. Points outside the frontier (such as point *I*) are infeasible or unattainable. Any point inside the curve, such as *U*, indicates that the economy has not attained productive efficiency, as is the case, for instance, when unemployment is high during severe business cycles.

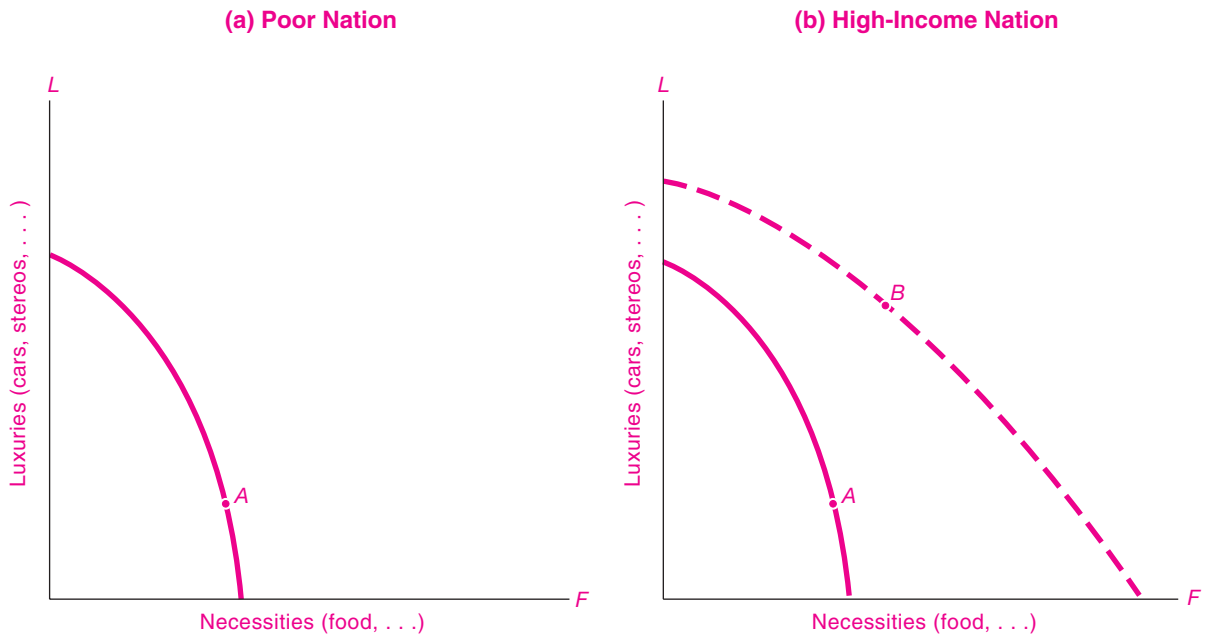


FIGURE 1-3. Economic Growth Shifts the PPF Outward

(a) Before development, the nation is poor. It must devote almost all its resources to food and enjoys few comforts. (b) Growth of inputs and technological change shift out the PPF. With economic growth, a nation moves from *A* to *B*, expanding its food consumption little compared with its increased consumption of luxuries. It can increase its consumption of both goods if it desires.

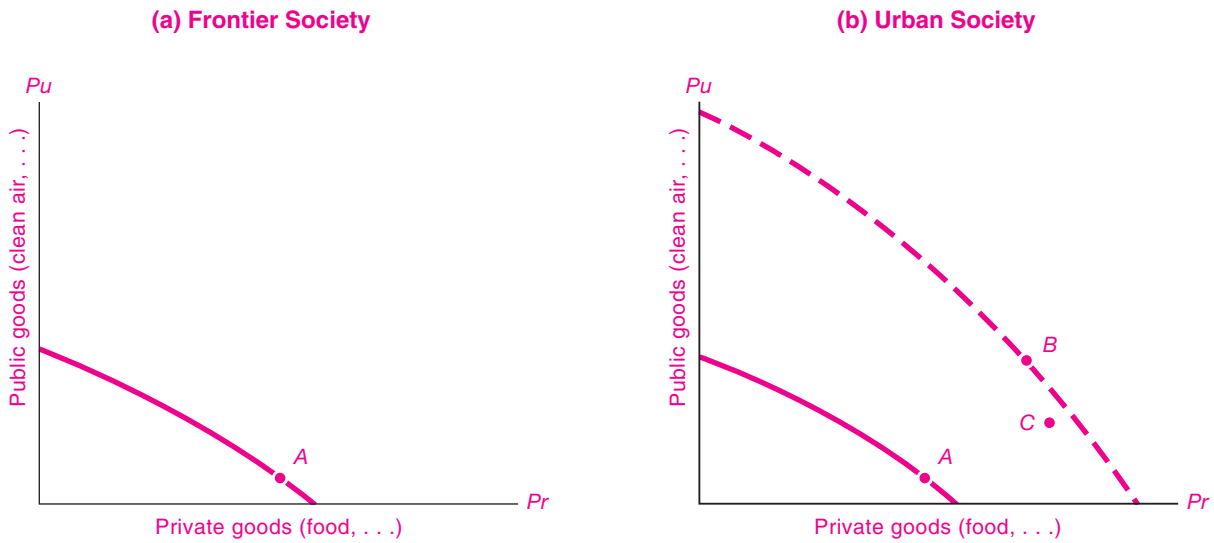


FIGURE I-4. Economies Must Choose between Public Goods and Private Goods

(a) A poor frontier society lives from hand to mouth, with little left over for public goods like clean air or public health. (b) A modern urbanized economy is more prosperous and chooses to spend more of its higher income on public goods and government services (roads, environmental protection, and education).

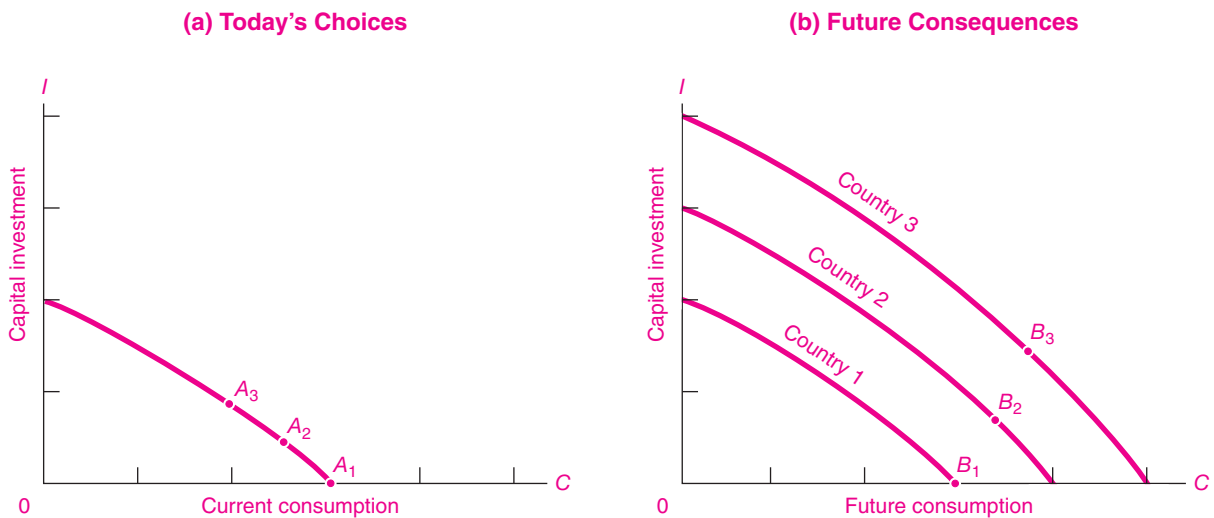


FIGURE I-5. Investment for Future Consumption Requires Sacrificing Current Consumption

A nation can produce either current-consumption goods (pizzas and concerts) or investment goods (pizza ovens and concert halls). (a) Three countries start out even. They have the same *PPF*, shown in the panel on the left, but they have different investment rates. Country 1 does not invest for the future and remains at A_1 (merely replacing machines). Country 2 abstains modestly from consumption and invests at A_2 . Country 3 sacrifices a great deal of current consumption and invests heavily. (b) In the following years, countries that invest more heavily forge ahead. Thus thrifty Country 3 has shifted its *PPF* far out, while Country 1's *PPF* has not moved at all. Countries that invest heavily can have *both* higher investment and consumption in the future.

out the *PPF*. The figure also illustrates that poor countries must devote most of their resources to food production while rich countries can afford more luxuries as productive potential increases.

Figure 1-4 depicts the choice between private goods (bought at a price) and public goods (paid for by taxes). Poor countries can afford little of public goods like public health and primary education. But with economic growth, public goods as well as environmental quality take a larger share of output.

Figure 1-5 portrays an economy's choice between (a) current-consumption goods and (b) investment in capital goods (machines, factories, etc.). By sacrificing current consumption and producing more capital goods, a nation's economy can grow more rapidly, making possible more of *both* goods (consumption and investment) in the future.



Be Not Time's Fool

The great American poet Carl Sandburg wrote, "Time is the coin of your life. It is the only coin you have, and only you can determine how it will be spent. Be careful lest you let other people spend it for you." This emphasizes that one of the most important decisions that people confront is how to use their time.

We can illustrate this choice using the production-possibility frontier. For example, as a student, you might have 10 hours to study for upcoming tests in both economics and history. If you study only history, you will get a high grade there and do poorly in economics, and vice versa. Treating the grades on the two tests as the "output" of your studying, sketch out the *PPF* for grades, given your limited time resources. Alternatively, if the two student commodities are "grades" and "fun," how would you draw this *PPF*? Where are you on this frontier? Where are your lazy friends?

Recently, the United States collected data on how Americans use their time. Keep a diary of your time use for two or three days. Then go to www.bls.gov/tus/home.htm and compare how you spend your time with the results for other people.

Opportunity Costs

When Robert Frost wrote of the road not taken, he pointed to one of the deepest concepts of economics, *opportunity cost*. Because our resources are limited, we must decide how to allocate our incomes or time. When

you decide whether to study economics, buy a car, or go to college, you will give something up—there will be a forgone opportunity. The next-best good that is forgone represents the opportunity cost of a decision.

The concept of opportunity cost can be illustrated using the *PPF*. Examine the frontier in Figure 1-2, which shows the tradeoff between guns and butter. Suppose the country decides to increase its gun purchases from 9000 guns at *D* to 12,000 units at *C*. What is the opportunity cost of this decision? You might calculate the cost in dollar terms. But in economics we always need to "pierce the veil" of money to examine the *real* impacts of alternative decisions. On the most fundamental level, the opportunity cost of moving from *D* to *C* is the butter that must be given up to produce the extra guns. In this example, the opportunity cost of the 3000 extra guns is 1 million pounds of butter forgone.

Or consider the real-world example of the cost of opening a gold mine near Yellowstone National Park. The developer argues that the mine will have but a small cost because Yellowstone's revenues will hardly be affected. But an economist would answer that the dollar receipts are too narrow a measure of cost. We should ask whether the unique and precious qualities of Yellowstone might be degraded if a gold mine were to operate, with the accompanying noise, water and air pollution, and decline in amenity values for visitors. While the dollar cost might be small, the opportunity cost in lost wilderness values might be large indeed.

In a world of scarcity, choosing one thing means giving up something else. The opportunity cost of a decision is the value of the good or service forgone.

Efficiency

Economists devote much of their study to exploring the efficiency of different kinds of market structures, incentives, and taxes. Remember that efficiency means that the economy's resources are being used as effectively as possible to satisfy people's desires. One important aspect of overall economic efficiency is productive efficiency, which is easily pictured in terms of the *PPF*. Efficiency means that the economy is *on* the frontier rather than *inside* the production-possibility frontier.

Productive efficiency occurs when an economy cannot produce more of one good without producing less of another good; this implies that the economy is on its production-possibility frontier.

Let's see why productive efficiency requires being on the *PPF*. Start in the situation shown by point *D* in Figure 1-2. Say the market calls for another million pounds of butter. If we ignored the constraint shown by the *PPF*, we might think it possible to produce more butter without reducing gun production, say, by moving to point *I*, to the right of point *D*. But point *I* is outside the frontier, in the "infeasible" region. Starting from *D*, we cannot get more butter without giving up some guns. Hence point *D* displays productive efficiency, while point *I* is infeasible.

One further point about productive efficiency can be illustrated using the *PPF*: Being on the *PPF* means that producing more of one good inevitably requires sacrificing other goods. When we produce more guns, we are substituting guns for butter. *Substitution* is the law of life in a full-employment economy, and the production-possibility frontier depicts the menu of society's choices.

Waste from Business Cycles and Environmental Degradation. Economies suffer from inefficient use of resources for many reasons. When there are unemployed resources, the economy is not on its production-possibility frontier at all but, rather, somewhere *inside* it. In Figure 1-2, point *U* represents a point inside the *PPF*; at *U*, society is producing only 2 units of butter and 6 units of guns. Some resources are unemployed, and by putting them to work, we can increase our output of all goods; the economy can move from *U* to *D*, producing more butter and more guns, thus improving the economy's efficiency. We can have our guns and eat more butter too.

Historically, one source of inefficiency occurs during business cycles. From 1929 to 1933, in the Great Depression, the total output produced in the American economy declined by 25 percent. The economy did not suffer from an inward shift of the *PPF* because of technological forgetting. Rather, panics, bank failures, bankruptcies, and reduced spending moved the economy *inside* its *PPF*. A decade later, the military expenditures for World War II expanded demand, and output grew rapidly as the economy pushed back to the *PPF*.

Similar situations occur periodically during business-cycle recessions. The latest growth slowdown occurred in 2007–2008 when problems in housing and credit markets spread through the entire economy. The economy's underlying productivity had

not suddenly declined during those years. Rather, reduced overall spending pushed the economy temporarily inside its *PPF* for that period.

A different kind of inefficiency occurs when markets are failing to reflect true scarcities, as with environmental degradation. Suppose that an unregulated business decides to dump chemicals in a river, killing fish and ruining recreational opportunities. The firm is not necessarily doing this because it has evil intent. Rather, the prices in the marketplace do not reflect true social priorities—the price on polluting in an unregulated environment is zero rather than the true opportunity cost in terms of lost fish and recreation.

Environmental degradation can also push the economy inside its *PPF*. The situation is illustrated in Figure 1-4(b). Because businesses do not face correct prices, the economy moves from point *B* to point *C*. Private goods are increased, but public goods (like clean air and water) are decreased. Efficient regulation of the environment could move northeast back to the dashed efficient frontier.

As we close this introductory chapter, let us return briefly to our opening theme, Why study economics? Perhaps the best answer to the question is a famous one given by Keynes in the final lines of *The General Theory of Employment, Interest and Money*:

The ideas of economists and political philosophers, both when they are right and when they are wrong, are more powerful than is commonly understood. Indeed the world is ruled by little else. Practical men, who believe themselves to be quite exempt from any intellectual influences, are usually the slaves of some defunct economist. Madmen in authority, who hear voices in the air, are distilling their frenzy from some academic scribbler of a few years back. I am sure that the power of vested interests is vastly exaggerated compared with the gradual encroachment of ideas. Not, indeed, immediately, but after a certain interval; for in the field of economic and political philosophy there are not many who are influenced by new theories after they are twenty-five or thirty years of age, so that the ideas which civil servants and politicians and even agitators apply to current events are not likely to be the newest. But, soon or late, it is ideas, not vested interests, which are dangerous for good or evil.

To understand how the powerful ideas of economics apply to the central issues of human societies—ultimately, this is why we study economics.



SUMMARY

A. Why Study Economics?

1. What is economics? Economics is the study of how societies choose to use scarce productive resources that have alternative uses, to produce commodities of various kinds, and to distribute them among different groups. We study economics to understand not only the world we live in but also the many potential worlds that reformers are constantly proposing to us.
2. Goods are scarce because people desire much more than the economy can produce. Economic goods are scarce, not free, and society must choose among the limited goods that can be produced with its available resources.
3. Microeconomics is concerned with the behavior of individual entities such as markets, firms, and households. Macroeconomics views the performance of the economy as a whole. Through all economics, beware of the fallacy of composition and the post hoc fallacy, and remember to keep other things constant.

B. The Three Problems of Economic Organization

4. Every society must answer three fundamental questions: *what*, *how*, and *for whom*? *What* kinds and quantities are produced among the wide range of all possible goods and services? *How* are resources used in producing these goods? And *for whom* are the goods produced (that is, what is the distribution of income and consumption among different individuals and classes)?
5. Societies answer these questions in different ways. The most important forms of economic organization today are *command* and *market*. The command economy is directed by centralized government control; a market economy is guided by an informal system of prices and profits in which most decisions are made by private individuals and firms. All societies have different

combinations of command and market; all societies are mixed economies.

C. Society's Technological Possibilities

6. With given resources and technology, the production choices between two goods such as butter and guns can be summarized in the *production-possibility frontier (PPF)*. The *PPF* shows how the production of one good (such as guns) is traded off against the production of another good (such as butter). In a world of scarcity, choosing one thing means giving up something else. The value of the good or service forgone is its opportunity cost.
7. Productive efficiency occurs when production of one good cannot be increased without curtailing production of another good. This is illustrated by the *PPF*. When an economy is on its *PPF*, it can produce more of one good only by producing less of another good.
8. Production-possibility frontiers illustrate many basic economic processes: how economic growth pushes out the frontier, how a nation chooses relatively less food and other necessities as it develops, how a country chooses between private goods and public goods, and how societies choose between consumption goods and capital goods that enhance future consumption.
9. Societies are sometimes inside their production-possibility frontier because of macroeconomic business cycles or microeconomic market failures. When credit conditions are tight or spending suddenly declines, a society moves inside its *PPF* in recessions; this occurs because of macroeconomic rigidities, not because of technological forgetting. A society can also be inside its *PPF* if markets fail because prices do not reflect social priorities, such as with environmental degradation from air and water pollution.

CONCEPTS FOR REVIEW

Fundamental Concepts

scarcity and efficiency
 free goods vs. economic goods
 macroeconomics and microeconomics
 normative vs. positive economics
 fallacy of composition, post hoc fallacy
 “keep other things constant”

Key Problems of Economic Organization

what, *how*, and *for whom*
 alternative economic systems:
 command vs. market
 laissez-faire
 mixed economies

Choice among Production Possibilities

inputs and outputs
 production-possibility frontier (*PPF*)
 productive efficiency and inefficiency
 opportunity cost

FURTHER READING AND INTERNET WEBSITES

Further Reading

Robert Heilbroner, *The Worldly Philosophers*, 7th ed. (Touchstone Books, 1999), provides a lively biography of the great economists along with their ideas and impact. The authoritative work on the history of economic analysis is Joseph Schumpeter, *History of Economic Analysis* (McGraw-Hill, New York, 1954).

Websites

One of the greatest books of all economics is Adam Smith, *The Wealth of Nations* (many publishers, 1776). Every economics student should read a few pages to get the flavor of his writing. *The Wealth of Nations* can be

found at www.bibliomania.com/NonFiction/Smith/Wealth/index.html.

Log on to one of the Internet reference sites for economics such as *Resources for Economists on the Internet* (www.rfe.org). Browse through some of the sections to familiarize yourself with the site. You might want to look up your college or university, look at recent news in a newspaper or magazine, or check some economic data.

Two sites for excellent analyses of public policy issues in economics are those of the Brookings Institution (www.brook.edu) and of the American Enterprise Institute (www.aei.org). Each of these publishes books and has policy briefs online.

QUESTIONS FOR DISCUSSION

- The great English economist Alfred Marshall (1842–1924) invented many of the tools of modern economics, but he was most concerned with the application of these tools to the problems of society. In his inaugural lecture, Marshall wrote:

It will be my most cherished ambition to increase the numbers who Cambridge University sends out into the world with cool heads but warm hearts, willing to give some of their best powers to grappling with the social suffering around them; resolved not to rest content till they have opened up to all the material means of a refined and noble life. [*Memorials of Alfred Marshall*, A. C. Pigou, ed. (Macmillan and Co., London, 1925), p. 174, with minor edits.]

Explain how the cool head might provide the essential positive economic analysis to implement the normative value judgments of the warm heart. Do you agree with Marshall's view of the role of the teacher? Do you accept his challenge?

- The late George Stigler, an eminent conservative Chicago economist, wrote as follows:

No thoroughly egalitarian society has ever been able to construct or maintain an efficient and progressive economic system. It has been universal experience that some system of differential rewards is necessary to stimulate workers. [*The Theory of Price*, 3d ed. (Macmillan, New York, 1966), p. 19.]

Are these statements positive or normative economics? Discuss Stigler's view in light of Alfred Marshall's quote in question 1. Is there a conflict?

- Define each of the following terms carefully and give examples: *PPF*, scarcity, productive efficiency, inputs, outputs.
- Read the special section on time use (p. 13). Then do the exercise in the last paragraph. Construct a table that compares your time use with that of the average American. (For a graphical analysis, see question 5 of the appendix to this chapter.)
- Assume that Econoland produces haircuts and shirts with inputs of labor. Econoland has 1000 hours of labor available. A haircut requires $\frac{1}{2}$ hour of labor, while a shirt requires 5 hours of labor. Construct Econoland's production-possibility frontier.
- Assume that scientific inventions have doubled the productivity of society's resources in butter production without altering the productivity of gun manufacture. Redraw society's production-possibility frontier in Figure 1-2 to illustrate the new tradeoff.
- Some scientists believe that we are rapidly depleting our natural resources. Assume that there are only two inputs (labor and natural resources) producing two goods (concerts and gasoline) with no improvement in society's technology over time. Show what would happen to the *PPF* over time as natural resources are exhausted. How would invention and technological improvement modify your answer? On the basis of this example, explain why it is said that "economic growth is a race between depletion and invention."
- Say that Diligent has 10 hours to study for upcoming tests in economics and history. Draw a *PPF* for grades, given Diligent's limited time resources. If Diligent

studies inefficiently by listening to loud music and chatting with friends, where will Diligent's grade "output" be relative to the *PPF*? What will happen to the grade *PPF* if Diligent increases study inputs from 10 hours to 15 hours?

9. Consider the *PPF* for clean air and automobile travel.
- a. Explain why unregulated air pollution in automobiles would push a country inside its *PPF*. Illustrate

your discussion with a carefully drawn *PPF* for these two goods.

- b. Next explain how putting a price on harmful automobile emissions would increase both goods and move the country to its *PPF*. Illustrate by showing how correcting the "market failure" would change the final outcome.



Appendix I

HOW TO READ GRAPHS

A picture is worth a thousand words.

Chinese Proverb

Before you can master economics, you must have a working knowledge of graphs. They are as indispensable to the economist as a hammer is to a carpenter. So if you are not familiar with the use of diagrams, invest some time in learning how to read them—it will be time well spent.

What is a *graph*? It is a diagram showing how two or more sets of data or variables are related to one another. Graphs are essential in economics because, among other reasons, they allow us to analyze economic concepts and examine historical trends.

You will encounter many different kinds of graphs in this book. Some graphs show how variables change over time (see, for example, the inside of the front cover); other graphs show the relationship between different variables (such as the example we will turn to in a moment). Each graph in the book will help you understand an important economic relationship or trend.

THE PRODUCTION-POSSIBILITY FRONTIER

The first graph that you encountered in this text was the production-possibility frontier. As we showed in the body of this chapter, the production-possibility frontier, or *PPF*, represents the maximum amounts of a pair of goods or services that can both be produced with an economy's given resources, assuming that all resources are fully employed.

Let's follow up an important application, that of choosing between food and machines. The essential data for the *PPF* are shown in Table 1A-1, which is very much like the example in Table 1-1. Recall that each of the possibilities gives one level of food production and one level of machine production. As the quantity of food produced increases, the production of machines falls. Thus, if the economy produced 10 units of food, it could produce a maximum of 140 machines, but when the output of food is 20 units, only 120 machines can be manufactured.

Production-Possibility Graph

The data shown in Table 1A-1 can also be presented as a graph. To construct the graph, we represent each of the table's pairs of data by a single point on a two-dimensional plane. Figure 1A-1 displays in a graph

Alternative Production Possibilities		
Possibilities	Food	Machines
A	0	150
B	10	140
C	20	120
D	30	90
E	40	50
F	50	0

TABLE 1A-1. The Pairs of Possible Outputs of Food and Machines

The table shows six potential pairs of outputs that can be produced with the given resources of a country. The country can choose one of the six possible combinations.

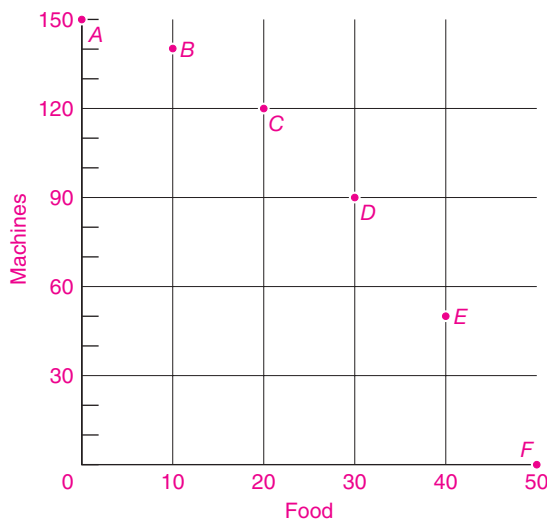


FIGURE 1A-1. Six Possible Pairs of Food-Machine Production Levels

This figure shows the data of Table 1A-1 in graphical form. The data are exactly the same, but the visual display presents the data more vividly.

the relationship between the food and machine outputs shown in Table 1A-1. Each pair of numbers is represented by a single point in the graph. Thus the row labeled “A” in Table 1A-1 is graphed as point A in Figure 1A-1, and similarly for points B, C, and so on.

In Figure 1A-1, the vertical line at the left and the horizontal line at the bottom correspond to the two variables—food and machines. A **variable** is an item of interest that can be defined and measured and that takes on different values at different times or places. Important variables studied in economics are prices, quantities, hours of work, acres of land, dollars of income, and so forth.

The horizontal line on a graph is referred to as the *horizontal axis*, or sometimes the *X axis*. In Figure 1A-1, food output is measured on the black horizontal axis. The vertical line is known as the *vertical axis*, or *Y axis*. In Figure 1A-1, it measures the number of machines produced. Point A on the vertical axis stands for 150 machines. The lower left-hand corner, where the two axes meet, is called the *origin*. It signifies 0 food and 0 machines in Figure 1A-1.

A Smooth Curve

In most economic relationships, variables can change by small amounts as well as by the large increments shown in Figure 1A-1. We therefore generally draw economic relationships as continuous curves. Figure 1A-2 shows the *PPF* as a smooth curve in which the points from A to F have been connected.

By comparing Table 1A-1 and Figure 1A-2, we can see why graphs are so often used in economics. The smooth *PPF* reflects the menu of choice for the economy. It is a visual device for showing what types of goods are available in what quantities. Your eye can see at a glance the relationship between machine and food production.

Slopes and Lines

Figure 1A-2 depicts the relationship between maximum food and machine production. One important way to describe the relationship between two variables is by the slope of the graph line.

The **slope** of a line represents the change in one variable that occurs when another variable changes. More precisely, it is the change in the variable *Y* on the vertical axis per unit change in the variable *X* on the horizontal axis. For example, in Figure 1A-2, say that food production rose from 25 to 26 units. The

The Production-Possibility Frontier

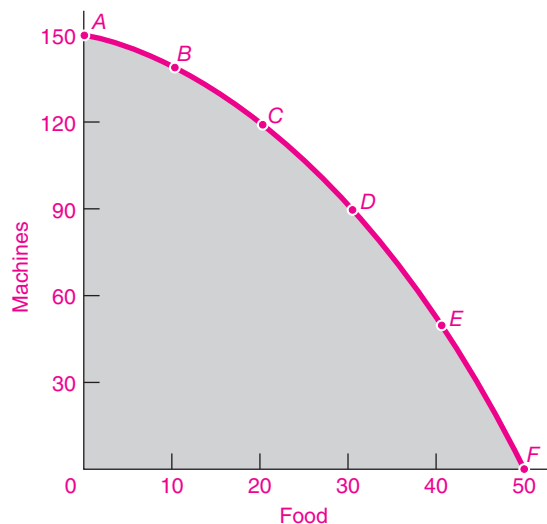


FIGURE 1A-2. A Production-Possibility Frontier

A smooth curve fills in between the plotted points, creating the production-possibility frontier.

slope of the curve in Figure 1A-2 tells us the precise change in machinery production that would take place. *Slope is an exact numerical measure of the relationship between the change in Y and the change in X.*

We can use Figure 1A-3 to show how to measure the slope of a straight line, say, the slope of the line between points B and D. Think of the movement from B to D as occurring in two stages. First comes a horizontal movement from B to C indicating a 1-unit increase in the *X* value (with no change in *Y*). Second comes a compensating vertical movement up or down, shown as *s* in Figure 1A-3. (The movement of 1 horizontal unit is purely for convenience. The formula holds for movements of any size.) The two-step movement brings us from one point to another on the straight line.

Because the *BC* movement is a 1-unit increase in *X*, the length of *CD* (shown as *s* in Figure 1A-3) indicates the change in *Y* per unit change in *X*. On a graph, this change is called the *slope* of the line *ABDE*.

Often slope is defined as “the rise over the run.” The *rise* is the vertical distance; in Figure 1A-3, the rise is the distance from C to D. The run is the horizontal distance; it is *BC* in Figure 1A-3. The rise over the run in this instance would be *CD* over *BC*. Thus

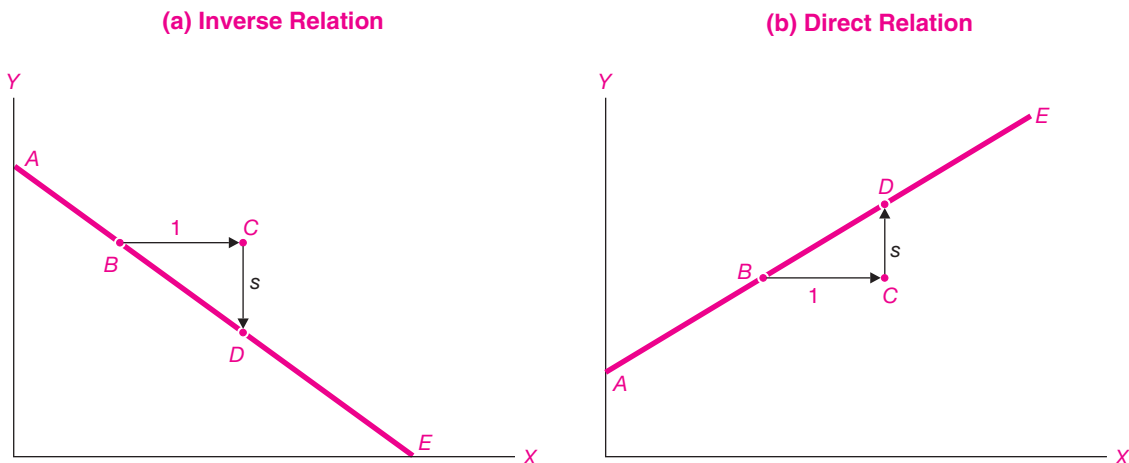


FIGURE 1A-3. Calculation of Slope for Straight Lines

It is easy to calculate slopes for straight lines as “rise over run.” Thus in both (a) and (b), the numerical value of the slope is $\text{rise/run} = CD/BC = s/1 = s$. Note that in (a), CD is negative, indicating a negative slope, or an inverse relationship between X and Y .

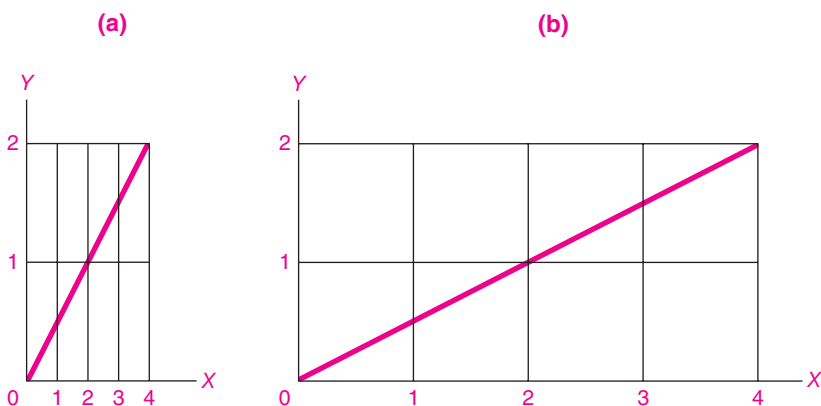


FIGURE 1A-4. Steepness Is Not the Same as Slope

Note that even though (a) looks steeper than (b), they display the same relationship. Both have a slope of $\frac{1}{2}$, but the X axis has been stretched out in (b).

the slope of BD is CD/BC . (For those who have studied calculus, question 7 at the end of this appendix relates slopes to derivatives.)

The key points to understand about slopes are the following:

1. The slope can be expressed as a number. It measures the change in Y per unit change in X , or “the rise over the run.”
2. If the line is straight, its slope is constant everywhere.
3. The slope of the line indicates whether the relationship between X and Y is direct or inverse.

Direct relationships occur when variables move in the same direction (that is, they increase or decrease together); *inverse relationships* occur when the variables move in opposite directions (that is, one increases as the other decreases).

Thus a negative slope indicates the X - Y relation is inverse, as it is in Figure 1A-3(a). Why? Because an increase in X calls for a decrease in Y .

People sometimes confuse slope with the appearance of steepness. This conclusion is often but not always valid. The steepness depends on the scale of the graph. Panels (a) and (b) in Figure 1A-4 both

portray exactly the same relationship. But in (b), the horizontal scale has been stretched out compared with (a). If you calculate carefully, you will see that the slopes are exactly the same (and are equal to $\frac{1}{2}$).

Slope of a Curved Line

A curved or nonlinear line is one whose slope changes. Sometimes we want to know the slope at a *given point*, such as point *B* in Figure 1A-5. We see that the slope at point *B* is positive, but it is not obvious exactly how to calculate the slope.

To find the slope of a smooth curved line at a point, we calculate the slope of the straight line that just touches, but does not cross, the curved line at the point in question. Such a straight line is called a *tangent* to the curved line. Put differently, the slope of a curved line at a point is given by the slope of the straight line that is tangent to the curve at the given point. Once we draw the tangent line, we find the slope of the tangent line with the usual right-angle measuring technique discussed earlier.

To find the slope at point *B* in Figure 1A-5, we simply construct straight line *FBJ* as a tangent to the curved line at point *B*. We then calculate the slope of the tangent as NJ/MN . Similarly, the tangent line *GH* gives the slope of the curved line at point *D*.

Another example of the slope of a nonlinear line is shown in Figure 1A-6. This shows a typical microeconomics curve, which is dome-shaped and has a maximum at point *C*. We can use our method of slopes as tangents to see that the slope of the curve is always positive in the region where the curve is rising and negative in the falling region. At the peak or maximum of the curve, the slope is exactly zero. A zero slope signifies that a tiny movement in the *X* variable around the maximum has no effect on the value of the *Y* variable.¹

¹ For those who enjoy algebra, the slope of a line can be remembered as follows: A straight line (or linear relationship) is written as $Y = a + bX$. For this line, the slope of the curve is b , which measures the change in *Y* per unit change in *X*.

A curved line or nonlinear relationship is one involving terms other than constants and the *X* term. An example of a nonlinear relationship is the quadratic equation $Y = (X - 2)^2$. You can verify that the slope of this equation is negative for $X < 2$ and positive for $X > 2$. What is its slope for $X = 2$?

For those who know calculus: A zero slope comes where the derivative of a smooth curve is equal to zero. For example, plot and use calculus to find the zero-slope point of a curve defined by the function $Y = (X - 2)^2$.

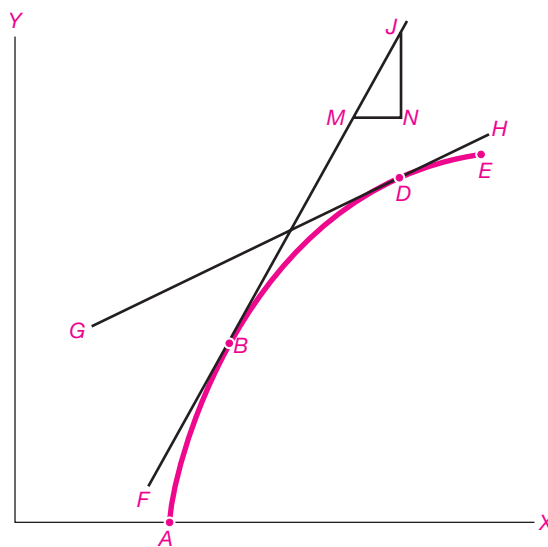


FIGURE 1A-5. Tangent as Slope of Curved Line

By constructing a tangent line, we can calculate the slope of a curved line at a given point. Thus the line *FBMJ* is tangent to smooth curve *ABDE* at point *B*. The slope at *B* is calculated as the slope of the tangent line, that is, as NJ/MN .

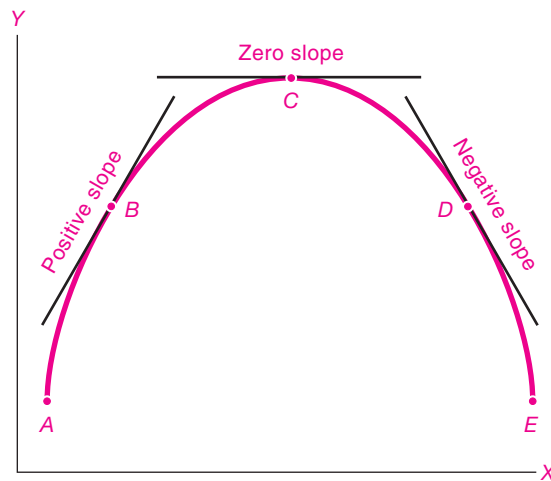


FIGURE 1A-6. Different Slopes of Nonlinear Curves

Many curves in economics first rise, then reach a maximum, then fall. In the rising region from *A* to *C* the slope is positive (see point *B*). In the falling region from *C* to *E* the slope is negative (see point *D*). At the curve's maximum, point *C*, the slope is zero. (What about a U-shaped curve? What is the slope at its minimum?)

Slope as the Marginal Value

One of the most important concepts in economics is *marginal*, which always means “additional” or “extra.” For example, we talk about “marginal cost,” which means the extra cost that is incurred when a firm produces an extra unit of output. Similarly, in fiscal economics, we discuss the “marginal tax rate,” which denotes the additional taxes that are paid when an individual earns an additional dollar of income.

We can calculate the marginal value in a relationship from the slope. Figure 1A-3 shows the marginal values for two straight lines. Look first at Figure 1A-3(b). Perhaps the Y variable is taxes and the X variable is income. Then the slope s represents the marginal tax rate. For every unit of X , taxes go up by s units. For many taxpayers, the marginal tax rate would be between 0.20 and 0.40.

Next examine Figure 1A-3(a). Here, the marginal value is negative. This might represent what happens when a particular area is overfished, where the X variable is number of boats and the Y variable is total fish catch. Because of overfishing, the marginal catch per boat is actually negative because the stock of fish is being depleted.

We can also apply this concept to curved lines. What is the marginal value at point B in Figure 1A-5? You can calculate that each MN units of X produce NJ units of Y . The marginal value at B is also the slope, which is NJ/MN . Note that the marginal value is declining as X increases because the curve is concave or dome-shaped.

Query: What is the marginal value of the relationship in Figure 1A-6 at point C ? Make sure you can explain why the marginal value is zero.

Shifts of and Movement along Curves

An important distinction in economics is that between shifts of curves and movement along curves. We can examine this distinction in Figure 1A-7. The inner production-possibility frontier reproduces the *PPF* in Figure 1A-2. At point D society chooses to produce 30 units of food and 90 units of machines. If society decides to consume more food with a given *PPF*, then it can *move along* the *PPF* to point E . This movement along the curve represents choosing more food and fewer machines.

Suppose that the inner *PPF* represents society’s production possibilities for 1990. If we return to the

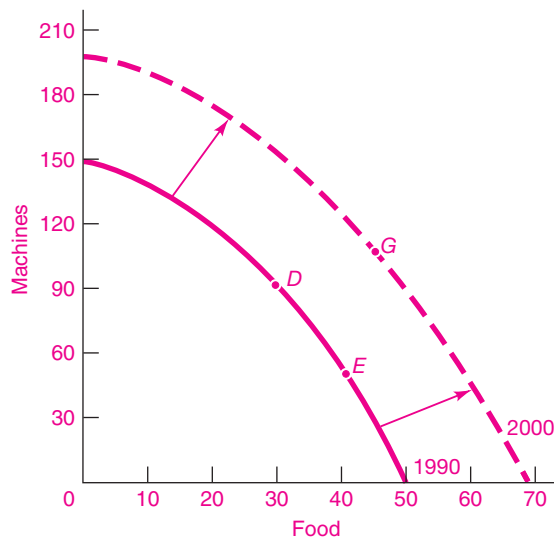


FIGURE 1A-7. Shift of Curves versus Movement along Curves

In using graphs, it is essential to distinguish *movement along* a curve (such as from high-investment D to low-investment E) from a *shift* of a curve (as from D in an early year to G in a later year).

same country in 2000, we see that the *PPF* has *shifted* from the inner 1990 curve to the outer 2000 curve. (This shift would occur because of technological change or because of an increase in labor or capital available.) In the later year, society might choose to be at point G , with more food and machines than at either D or E .

The point of this example is that in the first case (moving from D to E) we see movement along the curve, while in the second case (from D to G) we see a shift of the curve.

Some Special Graphs

The *PPF* is one of the most important graphs of economics, one depicting the relationship between two economic variables (such as food and machines or guns and butter). You will encounter other types of graphs in the pages that follow.

Time Series Some graphs show how a particular variable has changed over time. Look, for example, at the graphs on the inside front cover of this text.

The left-hand graph shows a time series, since the American Revolution, of a significant macroeconomic variable, the ratio of the federal government debt to total gross domestic product—this ratio is the *debt-GDP ratio*. Time-series graphs have time on the horizontal axis and variables of interest (in this case, the debt-GDP ratio) on the vertical axis. This graph shows that the debt-GDP ratio has risen sharply during every major war.

Scatter Diagrams Sometimes individual data points will be plotted, as in Figure 1A-1. Often, combinations of variables for different years will be plotted. An important example of a scatter diagram from macroeconomics is the *consumption function*, shown in Figure 1A-8. This scatter diagram shows the nation's total disposable income on the horizontal axis and total consumption (spending by households on goods like food, clothing, and housing) on the vertical axis. Note that consumption is very closely linked to income, a vital clue for understanding changes in national income and output.

Diagrams with More than One Curve Often it is useful to put two curves in the same graph, thus obtaining a “multicurve diagram.” The most important example is the *supply-and-demand diagram*, shown in Chapter 3 (see page 55). Such graphs can show two different relationships simultaneously, such as how consumer purchases respond to price (demand) and how business production responds to price (supply).

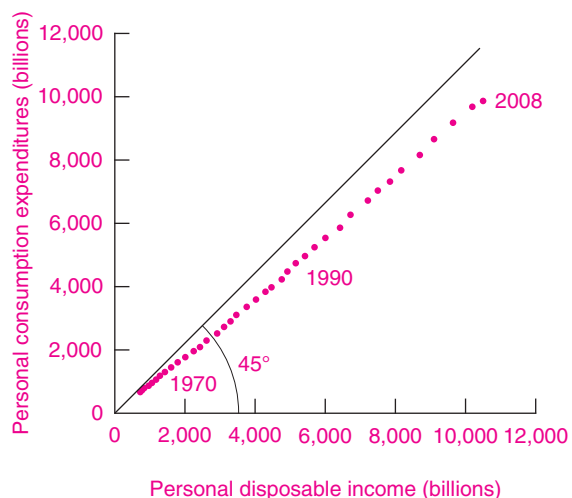


FIGURE 1A-8. Scatter Diagram of Consumption Function Shows Important Macroeconomic Law

The dots show a scatter diagram of income and consumption. Note how close the relationship is between the two. This forms the basis for the *consumption function* of macroeconomics.

By graphing the two relationships together, we can determine the price and quantity that will hold in a market.

This concludes our brief excursion into graphs. Once you have mastered these basic principles, the graphs in this book, and in other areas, can be both fun and instructive.



SUMMARY TO APPENDIX

1. Graphs are an essential tool of modern economics. They provide a convenient presentation of data or of the relationships among variables.
2. The important points to understand about a graph are: What is on each of the two axes (horizontal and vertical)? What are the units on each axis? What kind of relationship is depicted in the curve or curves shown in the graph?
3. The relationship between the two variables in a curve is given by its slope. The slope is defined as “the rise over

the run,” or the increase in Y per unit increase in X . If it is upward- (or positively) sloping, the two variables are directly related; they move upward or downward together. If the curve has a downward (or negative) slope, the two variables are inversely related.

4. In addition, we sometimes see special types of graphs: time series, which show how a particular variable moves over time; scatter diagrams, which show observations on a pair of variables; and multicurve diagrams, which show two or more relationships in a single graph.

CONCEPTS FOR REVIEW

Elements of Graphs

horizontal, or X , axis
 vertical, or Y , axis
 slope as “rise over run”
 slope (negative, positive, zero)
 tangent as slope of curved line

Examples of Graphs

time-series graphs
 scatter diagrams
 multivariate graphs

QUESTIONS FOR DISCUSSION

- Consider the following problem: After your 8 hours a day of sleep, you have 16 hours a day to divide between leisure and study. Let leisure hours be the X variable and study hours be the Y variable. Plot the straight-line relationship between all combinations of X and Y on a blank piece of graph paper. Be careful to label the axes and mark the origin.
- In question 1, what is the slope of the line showing the relationship between study and leisure hours? Is it a straight line?
- Let us say that you absolutely need 6 hours of leisure per day, no more, no less. On the graph, mark the point that corresponds to 6 hours of leisure. Now consider a *movement along the curve*: Assume that you decide that you need only 4 hours of leisure a day. Plot the new point.
- Next show a *shift of the curve*: You find that you need less sleep, so you have 18 hours a day to devote to leisure and study. Draw the new (shifted) curve.
- As suggested in the special section on time use, keep a diary of your time use by half-hour increments for 3 days; record studying, sleeping, working, leisure, and other uses. Then draw a time production-possibility curve, like Figure 1A-2, between leisure and all other activities. Locate each of your 3 days on the time PPF . Then put the average for all Americans on the same graph. How do you compare with the average person?
- Go to the website of the Bureau of Economic Analysis at www.bea.gov. Then click on “Gross Domestic Product.” On the next page, click on “Interactive NIPA data.” Then click on “Frequently Requested NIPA Tables.” Click on “Table 1.2 (Real Gross Domestic Product),” which is the total output of the economy. This will probably come up with the quarterly data.
 - Construct a graph that shows the time series for real GDP for the last six quarters. Is the general trend upward or downward? (In macroeconomics, we will learn that the slope is downward in recessions.)
 - Construct a scatter plot showing “Imports” on the vertical axis and “Gross domestic product” on the horizontal axis. Describe the relationship between the numbers. (In macroeconomics, this will be the marginal propensity to import.)
- For those who have studied calculus*: The slope of a smooth line or curve is its derivative. The following are the equations for two inverse demand curves (where price is a function of output). For each curve, assume that the function holds only when $P \geq 0$ and $X \geq 0$.
 - $P = 100 - 5X$
 - $P = 100 - 20X + 1X^2$
 For each demand curve, determine its slope when $X = 0$ and when $X = 1$. For linear demand curves such as **a**, what is the condition under which the law of downward-sloping demand holds? Is curve **b** concave (like a dome) or convex (like a cup)?
- The marginal value of a curve is its slope, which is the same as the first derivative of a function. Calculate algebraically the marginal effect of output on price for the inverse demand curves **a** and **b** in question 7. Provide the numerical marginal values at $X = 10$ for both demand curves.

The Modern Mixed Economy



Every individual endeavors to employ his capital so that its produce may be of greatest value. He generally neither intends to promote the public interest, nor knows how much he is promoting it. He intends only his own security, only his own gain. And he is in this 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 society more effectually than when he really intends to promote it.

Adam Smith

The Wealth of Nations (1776)

Think for a moment about some of the goods and services that you consumed over the last few days. Perhaps you took an airline flight to school or bought some gasoline for the family car. You surely had some home-cooked food bought in a grocery store or a meal purchased at a restaurant. You might have bought a book (such as this textbook) or some pharmaceutical drugs.

Now consider some of the many steps that preceded your purchases. The airplane flight will illustrate the point very well. You may have purchased an airline ticket on the Internet. This simple-sounding purchase involves much tangible capital such as your computer, intellectual property (in software and designs), and sophisticated fiber-optic transmission lines, as well as complicated airline reservation systems and pricing models. The airlines do all this to make profits (although profits have been very modest in that sector).

At the same time, government plays an important role in air travel. It regulates airline safety, owns many airports, manages the traffic-control system, produces the public good of weather data and forecasting, and provides information on flight delays. And this list could go on into the public and private support of aircraft manufacturing, international agreements on airline competition, energy policy on fuels, and other areas.

The same point would apply—in different degrees depending upon the sector—to your purchases of clothing or gasoline or pharmaceuticals or just about any item. The economy of every country in the world is a **mixed economy**—a combination of private enterprise working through the marketplace and government regulation, taxation, and programs. What exactly is a market economy, and what makes it such a powerful engine of growth? What is the “capital” in “capitalism”? What government controls are needed

to make markets function effectively? The time has come to understand the principles that lie behind the market economy and to review government's role in economic life.

A. THE MARKET MECHANISM

Most economic activity in most high-income countries takes place in private markets—through the market mechanism—so we begin our systematic study there. Who is responsible for making the decisions in a market economy? You may be surprised to learn that *no single individual or organization or government is responsible for solving the economic problems in a market economy*. Instead, millions of businesses and consumers engage in voluntary trade, intending to improve their own economic situations, and their actions are invisibly coordinated by a system of prices and markets.

To see how remarkable this is, consider the city of New York. Without a constant flow of goods into and out of the city, New Yorkers would be on the verge of starvation within a week. But New Yorkers actually do very well economically. The reason is that goods travel for days and weeks from the surrounding counties, from 50 states, and from the far corners of the world, with New York as their destination.

How is it that 10 million people can sleep easily at night, without living in mortal terror of a breakdown in the elaborate economic processes upon which they rely? The surprising answer is that, without coercion or centralized direction by anyone, these economic activities are coordinated through the market.

Everyone in the United States notices how much the government does to control economic activity: it regulates drugs, fights fires, levies taxes, sends armies around the world, and so forth. But we seldom think about how much of our ordinary economic life proceeds without government intervention. Thousands of commodities are produced by millions of people every day, willingly, without central direction or master plan.

Not Chaos, but Economic Order

The market looks like a jumble of sellers and buyers. It seems almost a miracle that food is produced in

suitable amounts, gets transported to the right place, and arrives in a palatable form at the dinner table. But a close look at New York or other economies is convincing proof that a market system is neither chaos nor miracle. It is a system with its own internal logic. And it works.

A market economy is an elaborate mechanism for coordinating people, activities, and businesses through a system of prices and markets. It is a communication device for pooling the knowledge and actions of billions of diverse individuals. Without central intelligence or computation, it solves problems of production and distribution involving billions of unknown variables and relations, problems that are far beyond the reach of even today's fastest supercomputer. Nobody designed the market, yet it functions remarkably well. In a market economy, no single individual or organization is responsible for production, consumption, distribution, or pricing.

How do markets determine prices, wages, and outputs? Originally, a market was an actual place where buyers and sellers could engage in face-to-face bargaining. The *marketplace*—filled with slabs of butter, pyramids of cheese, layers of wet fish, and heaps of vegetables—used to be a familiar sight in many villages and towns, where farmers brought their goods to sell. In the United States today there are still important markets where many traders gather together to do business. For example, wheat and corn are traded at the Chicago Board of Trade, oil and platinum are traded at the New York Mercantile Exchange, and gems are traded at the Diamond District in New York City.

Markets are places where buyers and sellers interact, exchange goods and services or assets, and determine prices. There are markets for almost everything. You can buy artwork by old masters at auction houses in New York or pollution permits at the Chicago Board of Trade. A market may be centralized, like the stock market. It may be decentralized, as is the case for most workers. Or it may exist only electronically, as is increasingly the case with “e-commerce” on the Internet. Some of the most important markets are for financial assets, such as stocks, bonds, foreign exchange, and mortgages.

A market is a mechanism through which buyers and sellers interact to determine prices and exchange goods, services, and assets.

The central role of markets is to determine the **price** of goods. A price is the value of the good in terms of money (the role of money will be discussed later in this chapter). At a deeper level, prices represent the terms on which different items can be exchanged. The market price of a bicycle might be \$500, while that of a pair of shoes is \$50. In essence, the market is saying that shoes and bicycles trade on a 10-to-1 basis.

In addition, prices serve as *signals* to producers and consumers. If consumers want more of any good, the price will rise, sending a signal to producers that more supply is needed. When a terrible disease reduces beef production, the supply of beef decreases and raises the price of hamburgers. The higher price encourages farmers to increase their production of beef and, at the same time, encourages consumers to substitute other foods for hamburgers and beef products.

What is true of the markets for consumer goods is also true of markets for factors of production, such as land or labor. If more computer programmers are needed to run Internet businesses, the price of computer programmers (their hourly wage) will tend to rise. The rise in relative wages will attract workers into the growing occupation.

Prices coordinate the decisions of producers and consumers in a market. Higher prices tend to reduce consumer purchases and encourage production. Lower prices encourage consumption and discourage production. Prices are the balance wheel of the market mechanism.

Market Equilibrium. At every moment, some people are buying while others are selling; firms are inventing new products while governments are passing laws to regulate old ones; foreign companies are opening plants in America while American firms are selling their products abroad. Yet in the midst of all this turmoil, markets are constantly solving the *what, how, and for whom*. As they balance all the forces operating on the economy, markets are finding a **market equilibrium of supply and demand**.

A market equilibrium represents a balance among all the different buyers and sellers. Depending upon the price, households and firms all want to buy or sell different quantities. The market finds the equilibrium price that simultaneously meets the desires of

buyers and sellers. Too high a price would mean a glut of goods with too much output; too low a price would produce long lines in stores and a deficiency of goods. Those prices for which buyers desire to buy exactly the quantity that sellers desire to sell yield an equilibrium of supply and demand.

How Markets Solve the Three Economic Problems

We have just described how prices help balance consumption and production (or demand and supply) in an individual market. What happens when we put all the different markets together—beef, cars, land, labor, capital, and everything else? These markets work simultaneously to determine a general equilibrium of prices and production.

By matching sellers and buyers (supply and demand) in each market, a market economy simultaneously solves the three problems of *what, how, and for whom*. Here is an outline of a market equilibrium:

1. *What* goods and services will be produced is determined by the dollar votes of consumers in their daily purchase decisions. A century ago, many dollar votes for transportation went for horses and horseshoes; today, much is spent on automobiles and tires.

Firms, in turn, are motivated by the desire to maximize profits. **Profits** are net revenues, or the difference between total sales and total costs. Firms abandon areas where they are losing profits; by the same token, firms are lured by high profits into production of goods in high demand. Some of the most profitable activities today are producing and marketing drugs—drugs for depression, anxiety, and all other manner of human frailty. Lured by the high profits, companies are investing billions of dollars each year in research to come up with yet more new and improved medicines.

2. *How* things are produced is determined by the competition among different producers. The best way for producers to meet price competition and maximize profits is to keep costs at a minimum by adopting the most efficient methods of production. Sometimes change is incremental and consists of little more than tinkering with the machinery or adjusting the input mix to gain a cost advantage. At other times there are drastic

shifts in technology, as with steam engines displacing horses because steam was cheaper per unit of useful work, or airplanes replacing railroads as the most efficient mode for long-distance travel. Right now we are in the midst of just such a transition to a radically different technology, with computers revolutionizing many tasks in the workplace, from the checkout counter to the lecture room.

3. *For whom* things are produced—who is consuming and how much—depends, in large part, on the supply and demand in the markets for factors of production. Factor markets (i.e., markets for factors of production) determine wage rates, land rents, interest rates, and profits. Such prices are called *factor prices*. The same person may receive wages from a job, dividends from stocks, interest on a bond, and rent from a piece of property. By adding up all the revenues from all the factors, we can calculate the person's market income. The distribution of income among the population is thus determined by the quantity of factor services (person-hours, acres, etc.) and the prices of the factors (wage rates, land rents, etc.).

The Dual Monarchy

Who are the rulers in a market economy? Do giant companies like Microsoft and Toyota call the tune? Or perhaps Congress and the president? Or advertising moguls from Madison Avenue? All these people and institutions affect us, but in the end the major forces affecting the shape of the economy are the dual monarchs of *tastes* and *technology*.

One fundamental determinant is the tastes of the population. These innate and acquired tastes—as expressed in the dollar votes of consumer demands—direct the uses of society's resources. They pick the point on the production-possibility frontier (*PPF*).

The other major factor is the resources and technology available to a society. The economy cannot go outside its *PPF*. You can fly to Hong Kong, but there are no flights yet to Mars. Therefore, the economy's resources limit the candidates for the dollar votes of consumers. Consumer demand has to dovetail with business supply of goods and services to determine what is ultimately produced.

You will find it helpful to recall the dual monarchy when you wonder why some technologies fail in the marketplace. From the Stanley Steamer—a car that ran on steam—to the Premiere smokeless cigarette,

which was smokeless but also tasteless, history is full of products that found no markets. How do useless products die off? Is there a government agency that pronounces upon the value of new products? No such agency is necessary. Rather, they become extinct because there is no consumer demand for the products at the going market price. These products make losses rather than profits. This reminds us that profits serve as the rewards and penalties for businesses and guide the market mechanism.

Like a farmer using a carrot and a stick to coax a donkey forward, the market system deals out profits and losses to induce firms to produce desired goods efficiently.

A Picture of Prices and Markets

We can picture the circular flow of economic life in Figure 2-1. The diagram provides an overview of how consumers and producers interact to determine prices and quantities for both inputs and outputs. Note the two different kinds of markets in the circular flow. At the top are the product markets, or the flow of outputs like pizza and shoes; at the bottom are the markets for inputs or factors of production like land and labor. Further, see how decisions are made by two different entities, consumers and businesses.

Consumers buy goods and sell factors of production; businesses sell goods and buy factors of production. Consumers use their income from the sale of labor and other inputs to buy goods from businesses; businesses base their prices of goods on the costs of labor and property. Prices in goods markets are set to balance consumer demand with business supply; prices in factor markets are set to balance household supply with business demand.

All this sounds complicated. But it is simply the total picture of the intricate web of supplies and demands connected through a market mechanism to solve the economic problems of *what*, *how*, and *for whom*.

The Invisible Hand

It was Adam Smith who first recognized how a market economy organizes the complicated forces of supply and demand. In one of the most famous passages of all economics, quoted from *The Wealth of Nations* at the opening of this chapter, Smith saw the harmony between private profit and public interest. Go back and reread these paradoxical words. Particularly note

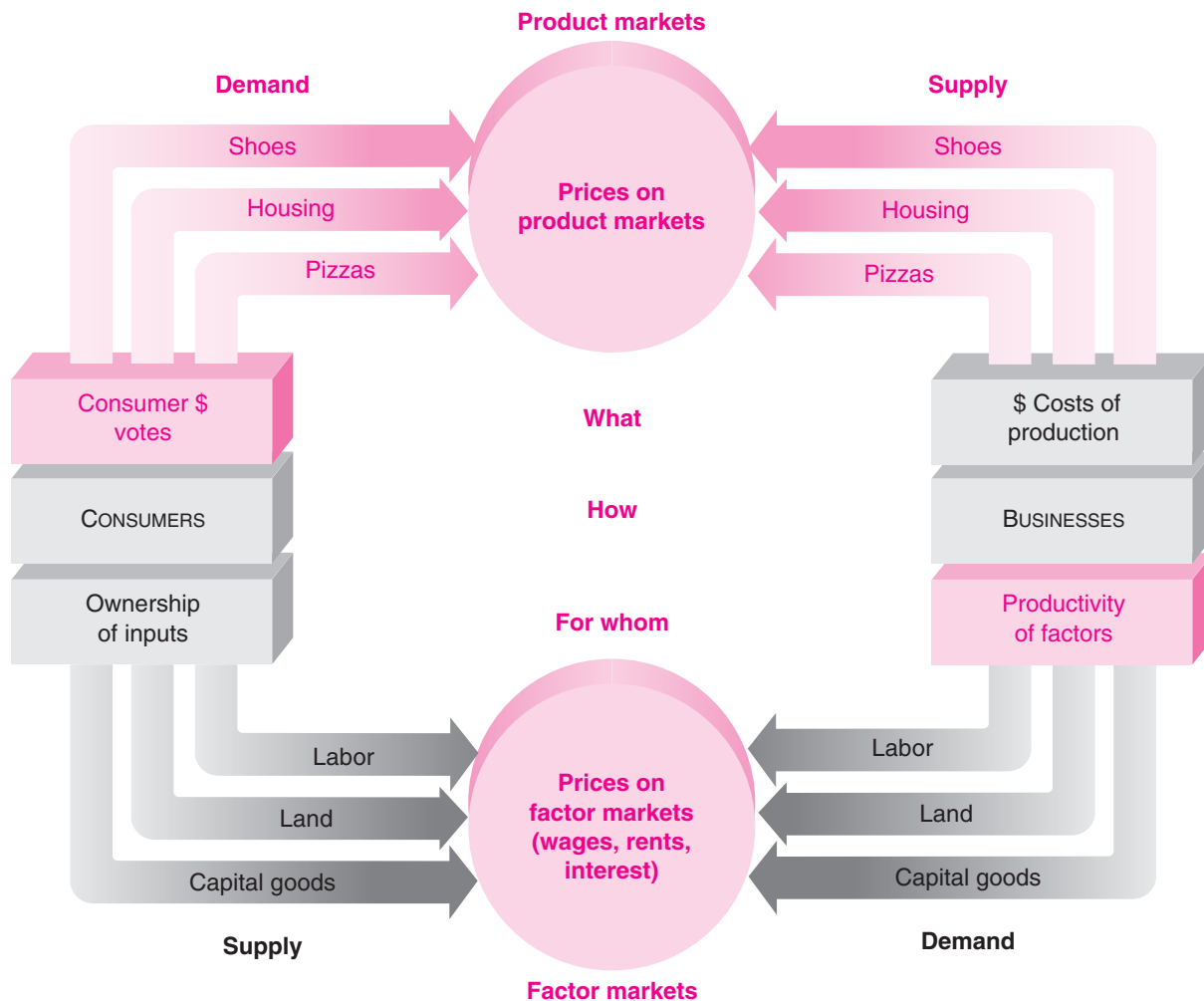


FIGURE 2-1. The Market System Relies on Supply and Demand to Solve the Trio of Economic Problems

We see here the circular flow of a market economy. Dollar votes of consumers (households, governments, and foreigners) interact with business supply in the product markets at top, helping to determine *what* is produced. Business demand for inputs meets the supply of labor and other inputs in the factor markets below, determining wage, rent, and interest payments; incomes thus influence *for whom* goods are delivered. Business competition to buy factor inputs and sell goods most cheaply determines *how* goods are produced.

the subtle point about the **invisible hand**—that private interest can lead to public gain *when it takes place in a well-functioning market mechanism*.

Smith's words were written in 1776. That same year was also marked by the American Declaration of Independence. It is no coincidence that both ideas appeared at the same time. Just as Americans were proclaiming freedom from tyranny, Adam Smith

was preaching a revolutionary doctrine emancipating trade and industry from the shackles of a feudal aristocracy. Smith held that government interference with market competition is almost certain to be injurious.

Smith's insight about the functioning of the market mechanism has inspired modern economists—both the admirers and the critics of capitalism.

Economic theorists have proved that under limited conditions a perfectly competitive economy is efficient (remember that an economy is producing efficiently when it cannot increase the economic welfare of anyone without making someone else worse off).

After two centuries of experience and thought, however, we recognize the limited scope of this doctrine. We know that there are “market failures,” that markets do not always lead to the most efficient outcome. One set of market failures concerns monopolies and other forms of imperfect competition. A second failure of the “invisible hand” comes when there are spillovers or externalities outside the marketplace—positive externalities such as scientific discoveries and negative spillovers such as pollution.

A final reservation comes when the income distribution is politically or ethically unacceptable. When any of these elements occur, Adam Smith’s invisible-hand doctrine breaks down and government may want to step in to mend the flawed invisible hand.

In summary:

Adam Smith discovered a remarkable property of a competitive market economy. Under perfect competition and with no market failures, markets will squeeze as many useful goods and services out of the available resources as is possible. But where monopolies or pollution or similar market failures become pervasive, the remarkable efficiency properties of the invisible hand may be destroyed.



Adam Smith: Founding Father of Economics

“For what purpose is all the toil and bustle of this world? What is the end of avarice and ambition, of the pursuit of wealth, of power, and pre-eminence?” Thus wrote Adam Smith (1723–1790), of Scotland, who glimpsed for the social world of economics what Isaac Newton recognized for the physical world of the heavens. Smith answered his questions in *The Wealth of Nations* (1776), where he explained the self-regulating natural order by which the oil of self-interest lubricates the economic machinery in an almost miraculous fashion. Smith believed that the toil and bustle had the effect of improving the lot of the common man and woman. “Consumption is the sole end and purpose of all production.”

Smith was the first apostle of economic growth. At the dawn of the Industrial Revolution, he pointed to the great

strides in productivity brought about by specialization and the division of labor. In a famous example, he described the manufacturing of a pin factory in which “one man draws out the wire, another straightens it, a third cuts it,” and so it goes. This operation allowed 10 people to make 48,000 pins in a day, whereas if “all wrought separately, they could not each of them make twenty, perhaps not one pin a day.” Smith saw the result of this division of labor as “universal opulence which extends itself to the lowest ranks of the people.” Imagine what he would think if he returned today to see what two more centuries of economic growth have produced!

Smith wrote hundreds of pages railing against countless cases of government folly and interference. Consider the seventeenth-century guild master who was attempting to improve his weaving. The town guild decided, “If a cloth weaver intends to process a piece according to his own invention, he should obtain permission from the judges of the town to employ the number and length of threads that he desires after the question has been considered by four of the oldest merchants and four of the oldest weavers of the guild.” Smith argued that such restrictions—whether imposed by government or by monopolies, whether on production or on foreign trade—limit the proper workings of the market system and ultimately hurt both workers and consumers.

None of this should suggest that Smith was an apologist for the establishment. He had a distrust of all entrenched power, private monopolies as much as public monarchies. He was for the common people. But, like many of the great economists, he had learned from his research that the road to waste is paved with good intentions.

Above all, it is Adam Smith’s vision of the self-regulating “invisible hand” that is his enduring contribution to modern economics.

B. TRADE, MONEY, AND CAPITAL

What are some of the distinguishing features of a modern economy? Three important ones are considered in this section:

1. An advanced economy is characterized by an elaborate network of trade that depends on specialization and an intricate division of labor.

2. Modern economies today make extensive use of money, which provides the yardstick for measuring economic values and is the means of payment.
3. Modern industrial technologies rest on the use of vast stocks of capital. Capital leverages human labor into a much more efficient factor of production and allows productivity many times greater than that possible in an earlier age.

TRADE, SPECIALIZATION, AND DIVISION OF LABOR

As compared to the economies of the 1700s, today's economies depend heavily on the specialization of individuals and firms, connected by an extensive network of trade. Modern economies have enjoyed rapid economic growth as increasing specialization has allowed workers to become highly productive in particular occupations and to trade their output for the commodities they need.

Specialization occurs when people and countries concentrate their efforts on a particular set of tasks—it permits each person and country to use to best advantage the specific skills and resources that are available. One of the facts of economic life is that, rather than have everyone do everything in a mediocre way, it is better to establish a *division of labor*—dividing production into a number of small specialized steps or tasks. A division of labor permits tall people to play basketball, numerate people to teach, and persuasive people to sell cars. It sometimes takes many years to receive the training for particular careers—it usually takes 14 postgraduate years to become a certified neurosurgeon.

Capital and land are also highly specialized. In the case of land, some lands form the precious sandy strips of beach between populous cities and warm oceans; others are valuable vineyard lands of France or California; still other lands border on deepwater ports and serve as centers of trade for the world.

Capital also is highly specialized. The computer software that went along with the labor to write this textbook took over a decade to be developed, but it is useless at managing an oil refinery or solving large numerical problems. One of the most impressive examples of specialization is the computer chip that manages automobiles, increases their efficiency, and can even serve as a “black box” to record accident data.

The enormous efficiency of specialization allows the intricate network of trade among people and nations that we see today. Very few of us produce a single finished good; we make but the tiniest fraction of what we consume. We might teach a small part of one college's curriculum, or empty coins from parking meters, or separate the genetic material of fruit flies. In exchange for this specialized labor, we will receive an income adequate to buy goods from all over the world.

The idea of *gains from trade* forms one of the central insights of economics. Different people or countries tend to specialize in certain areas; they then engage in the voluntary exchange of what they produce for what they need. Japan has grown enormously productive by specializing in manufacturing goods such as automobiles and consumer electronics; it exports much of its manufacturing output to pay for imports of raw materials. By contrast, countries which have tried the strategy of becoming self-sufficient—attempting to produce most of what they consume—have discovered that this is the road to stagnation. Trade can enrich all nations and increase *everyone's* living standards.

To summarize:

Specialization and trade are the key to high living standards. By specializing, people can become highly productive in a very narrow field of expertise. People can then trade their specialized goods for others' products, vastly increasing the range and quality of consumption and having the potential to raise everyone's living standards.



Globalization

You can hardly open a newspaper today without reading about the most recent trends in “globalization.” What exactly does this term mean? How can economics contribute to understanding the issues?

Globalization is a term that is used to denote an increase in economic integration among nations. Increasing integration is seen today in the dramatic growth in the flows of goods, services, and finance across national borders.

One major component of globalization is the steady increase in the share of national output devoted to imports and exports. With a continuous drop in transportation and communication costs, along with declining tariffs and other

barriers to trade, the share of trade in U.S. national output has more than doubled over the last half-century. Domestic producers now compete with producers from around the world in their prices and design decisions.

At a deeper level, however, globalization reflects an extension of specialization and division of labor to the entire world. Two centuries ago, most people lived on farms and produced virtually everything they consumed: food, shelter, clothing, fuel, and so on. Gradually, people specialized and bought much of their consumption from others in their community or nation. Today, many goods are produced in several countries and shipped around the world.

An interesting example of the globalized economy is the production of the iPod. Who makes the iPod? You might think that it is made by Apple, while if you look at the back of the iPod, it says “Made in China.” What is the truth here? The iPod is actually a small portable computer for delivering music. It has at least 451 parts, which are made all around the world. Apple designed the software and manages the production process, earning about \$80 for each \$299 of sales. China’s part consists primarily of assembly, under a Taiwanese subcontract, with about \$5 of labor costs. So, while the trade statistics record that an iPod sold in the United States incurs \$150 of trade deficit with China, only a tiny fraction of the \$150 was actually earned by China.

Hal Varian, chief economist for Google, summarized the results of this study very nicely:

Ultimately, there is no simple answer to who makes the iPod or where it is made. The iPod, like many other products, is made in several countries by dozens of companies, with each stage of production contributing a different amount to the final value. The real value of the iPod doesn’t lie in its parts or even in putting those parts together. The bulk of the iPod’s value is in the conception and design of the iPod. That is why Apple gets \$80 for each of these video iPods it sells, which is by far the largest piece of value added in the entire supply chain. Those clever folks at Apple figured out how to combine 451 mostly generic parts into a valuable product. They may not make the iPod, but they created it. In the end, that’s what really matters.¹

Evidence indicates that this process of “slicing up the value added” is typical of manufacturing activities in the United States and other high-income countries.

Globalization occurs in financial markets as well as in goods markets. Financial integration is seen in the

accelerated pace of lending and borrowing among nations as well as in the convergence of interest rates among different countries. The major causes of financial-market integration have been the dismantling of restrictions on capital flows among nations, cost reductions, and innovations in financial markets, particularly the use of new kinds of financial instruments.

Financial integration among nations has undoubtedly led to gains from trade, as nations with productive uses for capital can borrow from countries with excess savings. In the last two decades, Japan and China have served as the world’s major lending countries. Surprisingly, the United States has been the world’s largest borrower—partly because of its low national saving rate and partly because of the dynamism of its industries, such as information and biomedical technologies.

Global integration of goods and financial markets has produced impressive gains from trade in the form of lower prices, increased innovation, and more rapid economic growth. But these gains have been accompanied by painful side effects.

One consequence of economic integration is the unemployment and lost profits that occur when low-cost foreign producers displace domestic production. For example, from 1980 to 2007, U.S. employment in textiles and apparel fell from 2 million to 0.6 million workers. The unemployed textile workers found little solace in the fact that consumers were enjoying declining prices for Chinese clothing. Those who lose from increased international trade are the tireless advocates of “protectionism” in the form of tariffs and quotas on international trade.

A second consequence comes when financial integration triggers international financial crises. The latest crisis began in mid-2007 when a decline in U.S. housing prices spilled over into stock and bond markets around the world. One might ask why the Indian stock market should decline 20 or 30 percent because of problems in the U.S. housing market. The contagion arising from such disturbances is the result of closely linked markets. The irrational exuberance in financial markets in the 2000s led to extremely small risk premiums, raising asset prices around the world. When investors turned pessimistic in 2007 and 2008, risk premiums rose everywhere, including on Indian assets.

Globalization raises many new issues for policymakers. Are the gains from trade worth the domestic costs in terms of social disruption and dislocation? Should countries attempt to insulate themselves from global financial crises by walling off their financial markets? Does integration lead to greater income inequality? How should central

¹ See the website listings in the Further Reading section at the end of this chapter.

banks respond to financial instabilities that spread around the world? These questions are on the minds of policymakers who are attempting to deal with globalization.

MONEY: THE LUBRICANT OF EXCHANGE

If specialization permits people to concentrate on particular tasks, money then allows people to trade their specialized outputs for the vast array of goods and services produced by others.

Money is the means of payment in the form of currency and checks used to buy things. Money is a lubricant that facilitates exchange. When everyone trusts and accepts money as payment for goods and debts, trade is facilitated. Just imagine how complicated economic life would be if you had to barter goods for goods every time you wanted to buy a pizza or go to a concert. What services could you offer Sal's Pizza? What could you barter with your college to cover your tuition? Money acts as a matchmaker between buyers and sellers, effortlessly effecting little marriages of mutual self-interest billions of times every day.

Governments control the money supply through their central banks. But like other lubricants, money can get overheated and damage the economic engine. It can grow out of control and cause a hyperinflation, in which prices increase very rapidly. When that happens, people concentrate on spending their money quickly, before it loses its value, rather than investing it for the future. That's what happened to several Latin American countries in the 1980s, and many former socialist economies in the 1990s, when they had inflation rates exceeding 1000 percent or even 10,000 percent per year. Imagine getting your paycheck and having it lose 20 percent of its value by the end of the week!

Money is the medium of exchange. Proper management of the financial system is one of the major issues for government macroeconomic policy in all countries.

CAPITAL

The two great input partners in the productive process are labor and capital. We know what labor is, because we are all workers who rent our time for

wages. The other partner is **capital**—a produced and durable input which is itself an output of the economy. Capital consists of a vast and specialized array of machines, buildings, computers, software, and so on.

Most of us do not realize how much our daily activities depend upon capital, including the houses where we live, the highways on which we drive, and the wires that bring electricity and cable TV to our homes. The total net capital stock in the U.S. economy in 2008, including government-owned, business, and residential capital, amounted to more than \$150,000 per person.

Unlike land and labor, capital has to be produced before you can use it. For example, some companies build textile machines, which are then used to make shirts; some companies build farm tractors, which are then used to help produce corn.

Use of capital involves time-consuming, roundabout methods of production. People learned long ago that indirect and roundabout production techniques often are more efficient than direct methods of production. For example, the most direct method of catching fish is to wade into a stream and grab fish with your hands, but this yields more frustration than fish. By using a fishing rod (which is capital equipment), fishing time becomes more productive in terms of fish caught per day. By using even more capital, in the form of nets and fishing boats, fishing becomes productive enough to feed many people and provide a good living to those who operate the specialized nets and equipment.

Growth from the Sacrifice of Current Consumption.

If people are willing to save—to abstain from present consumption and wait for future consumption—society can devote resources to new capital goods. A larger stock of capital helps the economy grow faster by pushing out the *PPF*. Look back at Figure 1-5 to see how forgoing current consumption in favor of investment adds to future production possibilities. High rates of saving and investment help explain how Taiwan, China, and other Asian countries have grown so fast over the last three decades. By contrast, many poor countries are caught in a vicious circle called the “poverty trap.” They have low incomes and few productive outlets for their savings, they save and invest little, they grow slowly, and as a consequence they fall further behind in the economic standings of nations.

We summarize as follows:

Economic activity involves forgoing current consumption to increase our capital. Every time we invest—building a new factory or road, increasing the years or quality of education, or increasing the stock of useful technical knowledge—we are enhancing the future productivity of our economy and increasing future consumption.

Capital and Private Property

In a market economy, capital typically is privately owned, and the income from capital goes to individuals. Every patch of land has a deed, or title of ownership; almost every machine and building belongs to an individual or corporation. *Property rights* bestow on their owners the ability to use, exchange, paint, dig, drill, or exploit their capital goods. These capital goods also have market values, and people can buy and sell the capital goods for whatever price the goods will fetch. *The ability of individuals to own and profit from capital is what gives capitalism its name.*

However, while our society is one built on private property, property rights are limited. Society determines how much of “your” property you may bequeath to your heirs and how much must go in inheritance taxes to the government. Society determines how much your factory can pollute and where you can park your car. Even your home is not your castle: you must obey zoning laws and, if necessary, make way for a road.

Interestingly enough, the most valuable economic resource, labor, cannot be turned into a commodity that is bought and sold as private property. Since the abolition of slavery, it has been illegal to treat human earning power like other capital assets. You are not free to sell yourself; you must rent yourself at a wage.

Poor countries have discovered that it is difficult to have an efficient market economy when there are no laws enforcing contracts or guaranteeing that a company can keep its own profits. And when the legal framework breaks down, as in war-torn Iraq after 2003, people begin to fear for their lives. They have little time or inclination to make long-term investments for the future. Production falls and the quality of life deteriorates. Indeed, many of the most horrifying African famines were caused by civil war and the breakdown in the legal order, not by bad weather.

The environment is another example where poorly designed property rights harm the economy. Water and air are generally open-access resources, meaning that no one owns or controls them. As the saying goes, “Everyone’s business is nobody’s business.” In this area, people do not weigh all the costs of their actions. Someone might throw trash into the water or emit smoke into the air because the costs of dirty water or foul air are borne by other people. By contrast, people are less likely to throw trash on their own lawn or burn coal in their own living room because they themselves will bear the costs.

In recent years, economists have proposed extending property rights to environmental commodities by selling or auctioning permits to pollute and allowing them to be traded on markets. Preliminary evidence suggests that this extension of property rights has given much more powerful incentives to reduce pollution efficiently.

We have highlighted some key features of a modern economy: Specialization and the division of labor among people and countries create great efficiencies; increased production makes trade possible; money allows trade to take place efficiently; and a sophisticated financial system allows people’s savings to flow smoothly into other people’s capital.



Property Rights for Capital and Pollution

Economists often emphasize the importance of property rights in an efficient market economy. Property rights define how individuals or firms can own, buy, sell, and use capital goods and other property. These rights are enforced through the legal framework, which constitutes the set of laws within which a society operates. An efficient and acceptable legal framework for a market economy includes the definition of clear property rights, the laws of contract, and a system for adjudicating disputes.

C. THE VISIBLE HAND OF GOVERNMENT

In an idealized market economy, all goods and services are voluntarily exchanged for money at competitive market prices that reflect consumer valuations and social costs. Such a system squeezes the maximum in consumer satisfaction out of a society’s available resources. In reality, however, no economy actually conforms totally to the idealized world of the smoothly

functioning invisible hand. Rather, economic imperfections lead to such ills as pollution, unemployment, financial panics, and extremes of wealth and poverty.

No government anywhere in the world, at any time, no matter how conservative it claims to be, keeps its hands off the economy. Governments take on many tasks in response to the flaws in the market mechanism. The military, the police, and the national weather service are typical areas of government activity. Socially useful ventures such as space exploration and scientific research benefit from government funding. Governments may regulate some businesses (such as finance and drugs) while subsidizing others (such as education and biomedical research). Governments tax their citizens and redistribute some of the proceeds to the elderly and needy.

How do governments perform their functions? Governments operate by requiring people to pay taxes, obey regulations, and consume certain collective goods and services. Because of its coercive powers, the government can perform functions that would not be possible under voluntary exchange. Government coercion increases the freedoms and consumption of those who benefit while reducing the incomes and opportunities of those who are taxed or regulated.

Governments have three main economic functions in a market economy:

1. Governments increase *efficiency* by promoting competition, curbing externalities like pollution, and providing public goods.
2. Governments promote *equity* by using tax and expenditure programs to redistribute income toward particular groups.
3. Governments foster *macroeconomic stability and growth*—reducing unemployment and inflation while encouraging economic growth—through fiscal and monetary policy.

We will examine briefly each function.

EFFICIENCY

Adam Smith recognized that the virtues of the market mechanism are fully realized only when the checks and balances of perfect competition are present. What is meant by **perfect competition**? This technical term refers to a market in which no firm or consumer is large enough to affect the market price. For example, the wheat market is perfectly competitive

because the largest wheat farm, producing only a minuscule fraction of the world's wheat, can have no appreciable effect upon the price of wheat.

The invisible-hand doctrine applies to economies in which all markets are perfectly competitive. Perfectly competitive markets will produce an efficient allocation of resources, so the economy is on its production-possibility frontier. When all industries are subject to the checks and balances of perfect competition, as we will see later in this book, markets will produce the bundle of outputs most desired by consumers using the most efficient techniques and the minimum amount of inputs.

Alas, there are many ways that markets can fall short of efficient perfect competition. The three most important ones involve imperfect competition, such as monopolies; externalities, such as pollution; and public goods, such as national defense and lighthouses. In each case, market failure leads to inefficient production or consumption, and government can play a useful role in curing the disease.

Imperfect Competition

One serious deviation from an efficient market comes from *imperfect competition* or *monopoly* elements. Whereas under perfect competition no firm or consumer can affect prices, **imperfect competition** occurs when a buyer or seller can affect a good's price. For example, if the TV company or a labor union is large enough to influence the price of TV service or labor, respectively, some degree of imperfect competition has set in. When imperfect competition arises, society may move inside its *PPF*. This would occur, for example, if a single seller (a monopolist) raised the price to earn extra profits. The output of that good would be reduced below the most efficient level, and the efficiency of the economy would thereby suffer. In such a situation, the invisible-hand property of markets may be violated.

What is the effect of imperfect competition? Imperfect competition leads to prices that rise above cost and to consumer purchases that are reduced below efficient levels. The pattern of too high price and too low output is the hallmark of the inefficiencies associated with imperfect competition.

In reality, almost all industries possess some measure of imperfect competition. Airlines, for example, may have no competition on some of their routes but face several rivals on others. The extreme case of imperfect competition is the *monopolist*—a single

supplier who alone determines the price of a particular good or service. For example, Microsoft has been a monopolist in the production of Windows operating systems.

Over the last century, most governments have taken steps to curb the most extreme forms of imperfect competition. Governments sometimes regulate the price and profits of monopolies such as local water, telephone, and electric utilities. In addition, government antitrust laws prohibit actions such as price fixing and agreements to divide up markets. The most important check to imperfect competition, however, is the opening of markets to competitors, whether they be domestic or foreign. Few monopolies can long withstand the attack of competitors unless governments protect them through tariffs or regulations.

Externalities

A second type of inefficiency arises when there are spillovers or externalities, which involve involuntary imposition of costs or benefits. Market transactions involve voluntary exchange in which people exchange goods or services for money. When a firm buys a chicken to make frozen drumsticks, it buys the chicken from its owner in the chicken market, and the seller receives the full value of the hen. When you buy a haircut, the barber receives the full value for time, skills, and rent.

But many interactions take place outside markets. While airports produce a lot of noise, they generally do not compensate the people living around the airport for disturbing their peace. On the other hand, some companies which spend heavily on research and development have positive spillover effects for the rest of society. For example, researchers at AT&T invented the transistor and launched the electronic revolution, but AT&T's profits increased by only a small fraction of the global social gains. In each case, an activity has helped or hurt people outside the marketplace; that is, there was an economic transaction without an economic payment.

Externalities (or spillover effects) occur when firms or people impose costs or benefits on others outside the marketplace.

Negative externalities get most of the attention in today's world. As our society has become more

densely populated and as the production of energy, chemicals, and other materials increases, negative externalities or spillover effects have grown from little nuisances into major threats. This is where governments come in. Government *regulations* are designed to control externalities like air and water pollution, damage from strip mining, hazardous wastes, unsafe drugs and foods, and radioactive materials.

In many ways, governments are like parents, always saying no: Thou shalt not expose thy workers to dangerous conditions. Thou shalt not pour out poisonous smoke from thy factory chimney. Thou shalt not sell mind-altering drugs. Thou shalt not drive without wearing thy seat belt. And so forth. Finding the correct balance between free markets and government regulation is a difficult task that requires careful analysis of the costs and benefits of each approach. But few people today would argue for returning to the unregulated economic jungle where firms would be allowed to dump pollutants like plutonium wherever they wanted.

Public Goods

While negative externalities like pollution or global warming get most of the headlines, positive externalities are in fact of great economic significance. Consider the gradual elimination of smallpox, a disease which claimed millions of lives and disfigured even more. No private firm would undertake the research and vaccinations and fieldwork in far corners of the world that were needed to combat the disease. Incentives for private production were inadequate because the benefits were so widely dispersed around the world that firms could not capture the returns. The benefits of eliminating communicable diseases cannot be bought and sold in markets. Similar cases of positive externalities are construction of a highway network, operation of a national weather service, and support of basic science.

The polar case of a positive externality is a public good. **Public goods** are commodities which can be enjoyed by everyone and from which no one can be excluded. The classic example of a public good is national defense. Suppose a country decides to increase spending to defend its borders or to send peacekeepers to troubled lands. All must pay the piper and all will suffer the consequences, whether they want to or not.

However, once the government decides to buy the public good, the market mechanism is still at work. In providing public goods like national defense or lighthouses, the government is behaving exactly like any other large spender. By casting its dollar votes on these items, it causes resources to flow there. Once the dollar votes are cast, the market mechanism then takes over and channels resources to firms so that the lighthouses or tanks get produced.



Lighthouses as Public Goods

Lighthouses are an example of the concept of public goods. They save lives and cargoes.

But lighthouse keepers cannot reach out to collect fees from ships; nor, if they could, would it serve an efficient social purpose for them to exact an economic penalty on ships that use their services. The light can be provided most efficiently free of charge, for it costs no more to warn 100 ships than to warn a single ship of the nearby rocks.

But wait a moment. A recent history determined that lighthouses in England and Wales were in fact *privately* and *profitably* operated in the early days. They were financed by government-authorized “light duties” levied on ships which used nearby ports. Perhaps, we might conclude, lighthouses are not really public goods.

To understand the issues here, we need to return to fundamentals. The two key attributes of a public good are (1) that the cost of extending the service to an additional person is zero (“nonrivalry”) and (2) that it is impossible to exclude individuals from enjoying it (“nonexcludability”). Both these characteristics are applicable to lighthouses.

But a “public” good is not necessarily publicly provided. Often, it is provided by no one. Moreover, just because it is privately provided does not indicate that it is efficiently provided or that a market mechanism can pay for the lighthouse. The English example shows the interesting case where, *if* provision of the public good can be tied to another good or service (in this case, vessel tonnage), and *if* the government gives private persons the right to collect what are essentially taxes, then an alternative mechanism for *financing* the public good can be found. Such an approach would work poorly where the fees could not be easily tied to tonnage (such as in international waterways). And it would not work at all if the

government refused to privatize the right to collect light duties on shipping.

America shows quite a different experience. From its earliest days, the United States believed that navigational aids should be government-provided. Indeed, one of the first acts of the first Congress, and America’s first public-works law, provided that “the necessary support, maintenance, and repairs of all lighthouses, beacons, [and] buoys . . . shall be defrayed out of the Treasury of the United States.”

But, like many public goods, lighthouses were provided meager funding, and it is interesting to note what happened in the absence of navigational aids. A fascinating case lies off the east coast of Florida, which is a treacherous waterway with a 200-mile reef lying submerged a few feet below the surface in the most active hurricane track of the Atlantic Ocean. This heavily used channel was prime territory for storm, shipwreck, and piracy.

There were no lighthouses in Florida until 1825, and no private-sector lighthouses were ever built in this area. The market responded vigorously to the perils, however. What arose from the private sector was a thriving “wrecking” industry. Wreckers were ships that lurked near the dangerous reefs waiting for an unfortunate boat to become disabled. The wreckers would then appear, offer their help in saving lives and cargo, tow the boat into the appropriate port, and then claim a substantial part of the value of the cargo. Wrecking was the major industry of south Florida in the mid-nineteenth century and made Key West the richest town in America at that time.

While wreckers probably had positive value added, they provided none of the public-good attributes of lighthouses. Indeed, because many cargoes were insured, there was significant “moral hazard” involved in navigation. Conivance between wreckers and captains often enriched both at the expense of owners and insurance companies. It was only when the U.S. Lighthouse Service, financed by government revenues, began to build lighthouses through the Florida channel that the number of shipwrecks began to decrease—and the wreckers were gradually driven out of business.

Lighthouses are no longer a central issue of public policy today and are mainly of interest to tourists. They have been largely replaced by the satellite-based Global Positioning System (GPS), which is also a public good provided free by the government. But the history of lighthouses reminds us of the problems that can arise when public goods are inefficiently provided.

Taxes. The government must find the revenues to pay for its public goods and for its income-redistribution programs. Such revenues come from taxes levied on personal and corporate incomes, on wages, on sales of consumer goods, and on other items. All levels of government—city, state, and federal—collect taxes to pay for their spending.

Taxes sound like another “price”—in this case the price we pay for public goods. But taxes differ from prices in one crucial respect: taxes are not voluntary. Everyone is subject to the tax laws; we are all obligated to pay for our share of the cost of public goods. Of course, through our democratic process, we as citizens choose both the public goods and the taxes to pay for them. However, the close connection between spending and consumption that we see for private goods does not hold for taxes and public goods. I pay for a hamburger only if I want one, but I must pay my share of the taxes used to finance defense and public schools even if I don’t care a bit for these activities.

EQUITY

Our discussion of market failures like monopoly or externalities focused on defects in the allocative role of markets—imperfections that can be corrected by careful intervention. But assume for the moment that the economy functioned with complete efficiency—always on the production-possibility frontier and never inside it, always choosing the right amount of public versus private goods, and so forth. Even if the market system worked perfectly, it might still lead to a flawed outcome.

Markets do not necessarily produce a fair distribution of income. A market economy may produce inequalities in income and consumption that are not acceptable to the electorate.

Why might the market mechanism produce an unacceptable solution to the question *for whom?* The reason is that incomes are determined by a wide variety of factors, including effort, education, inheritance, factor prices, and luck. The resulting income distribution may not correspond to a fair outcome. Moreover, recall that goods follow dollar votes and not the greatest need. A rich man’s cat may drink the milk that a poor boy needs to remain healthy. Does this happen because the market is failing? Not

at all, for the market mechanism is doing its job—putting goods in the hands of those who have the dollar votes. Even the most efficient market system may generate great inequality.

Often the income distribution in a market system is the result of accidents of birth. Every year *Forbes* magazine lists the 400 richest Americans, and it’s impressive how many of them either received their wealth by inheritance or used inherited wealth as a springboard to even greater wealth. Would everyone regard that as necessarily right or ideal? Should someone be allowed to become a billionaire simply by inheriting 5000 square miles of rangeland or the family’s holding of oil wells? That’s the way the cookie crumbles under *laissez-faire* capitalism.

For most of American history, economic growth was a rising tide that lifted all boats, raising the incomes of the poor as well as those of the rich. But over the last three decades, changes in family structure and declining wages of the less skilled and less educated have reversed the trend. With a return to greater emphasis on the market has come greater homelessness, more children living in poverty, and deterioration of many of America’s central cities.

Income inequalities may be politically or ethically unacceptable. A nation does not need to accept the outcome of competitive markets as predetermined and immutable; people may examine the distribution of income and decide it is unfair. If a democratic society does not like the distribution of dollar votes under a *laissez-faire* market system, it can take steps to change the distribution of income.

Let’s say that voters decide to reduce income inequality. What tools could the government use to implement that decision? First, it can engage in *progressive taxation*, taxing large incomes at a higher rate than small incomes. It might impose heavy taxes on wealth or on large inheritances to break the chain of privilege. The federal income and inheritance taxes are examples of such redistributive progressive taxation.

Second, because low tax rates cannot help those who have no income at all, governments can make *transfer payments*, which are money payments to people. Such transfers today include aid for the elderly, blind, and disabled and for those with dependent children, as well as unemployment insurance for the jobless. This system of transfer payments provides a “safety net” to protect the unfortunate from

privation. And, finally, governments sometimes subsidize consumption of low-income groups by providing food stamps, subsidized medical care, and low-cost housing—though in the United States, such spending comprises a relatively small share of total spending.

Tax and transfer programs have always been controversial. Few people think about the public goods that their tax dollars are buying when they fill out their tax returns or look at the big deductions in their paychecks. Yet people also feel that societies must provide the basic necessities to everyone—for food, schooling, and health care.

What can economics contribute to debates about equality? Economics as a science cannot answer such normative questions as how much of our incomes should be taxed, how much income should be transferred to poor families, or what is the proper size of the public sector. These are political questions that are answered at the ballot box in our democratic societies.

Economics can, however, analyze the costs and benefits of different redistributive systems. Economists have devoted much time to analyzing the impact of different tax systems (such as those based on income or consumption). They have also studied whether giving poor people cash rather than goods and services is likely to be a more efficient way of reducing poverty.

And economics can remind us that the market giveth and the market taketh away. In a world of rapid structural change, we should always remember, “There, but for the grace of supply and demand, go I.”

MACROECONOMIC GROWTH AND STABILITY

Since its origins, capitalism has been plagued by periodic bouts of inflation (rising prices) and recession (high unemployment). Since World War II, for example, there have been 10 recessions in the United States, some putting millions of people out of work. These fluctuations are known as the *business cycle*.

Today, thanks to the intellectual contribution of John Maynard Keynes and his followers, we know how to control the worst excesses of the business cycle. By careful use of fiscal and monetary policies, governments can affect output, employment, and

inflation. The *fiscal policies* of government involve the power to tax and the power to spend. *Monetary policy* involves determining the supply of money and interest rates; these affect investment in capital goods and other interest-rate-sensitive spending. Using these two fundamental tools of macroeconomic policy, governments can influence the level of total spending, the rate of growth and level of output, the levels of employment and unemployment, and the price level and rate of inflation in an economy.

Governments in advanced industrial countries have successfully applied the lessons of the Keynesian revolution over the last half-century. Spurred on by active monetary and fiscal policies, the market economies witnessed a period of unprecedented economic growth in the three decades after World War II.

In the 1980s, governments became more concerned with designing macroeconomic policies to promote long-term objectives, such as economic growth and productivity. (*Economic growth* denotes the growth in a nation’s total output, while *productivity* represents the output per unit input or the efficiency with which resources are used.) For example, tax rates were lowered in most industrial countries in order to improve incentives for saving and production. Many economists emphasize the importance of public saving through smaller budget deficits as a way to increase national saving and investment.

Macroeconomic policies for stabilization and economic growth include fiscal policies (of taxing and spending) along with monetary policies (which affect interest rates and credit conditions). Since the development of macroeconomics in the 1930s, governments have succeeded in curbing the worst excesses of inflation and unemployment.

Table 2-1 summarizes the economic role played by government today. It shows the important governmental functions of promoting efficiency, achieving a fairer distribution of income, and pursuing the macroeconomic objectives of economic growth and stability. In all advanced industrial societies we find some variant of a **mixed economy**, in which the market determines output and prices in most individual sectors while government steers the overall economy with programs of taxation, spending, and monetary regulation.

Failure of market economy	Government intervention	Current examples of government policy
Inefficiency:		
Monopoly	Encourage competition	Antitrust laws, deregulation
Externalities	Intervene in markets	Antipollution laws, antismoking ordinances
Public goods	Encourage beneficial activities	Provide public education, build roads
Inequality:		
Unacceptable inequalities of income and wealth	Redistribute income	Progressive taxation of income and wealth Income-support or transfer programs (e.g., subsidize health care)
Macroeconomic problems:		
Business cycles (high inflation and unemployment)	Stabilize through macroeconomic policies	Monetary policies (e.g., changes in money supply and interest rates) Fiscal policies (e.g., taxes and spending programs)
Slow economic growth	Stimulate growth	Improve efficiency of tax system Raise national savings rate by reducing budget deficit or increasing budget surplus

TABLE 2-1. Government Can Remedy the Shortcomings of the Market

THE RISE OF THE WELFARE STATE

Our textbook focuses on the mixed market economy of modern industrialized nations. It will be useful to trace its history briefly. Before the rise of the market economy, going back to medieval times, aristocracies and town guilds directed much of the economic activity in Europe and Asia. However, about two centuries ago, governments began to exercise less and less power over prices and production methods. Feudalism gradually gave way to markets, or what we call the “market mechanism.”

In most of Europe and North America, the nineteenth century became the age of **laissez-faire**. This doctrine, which translates as “leave us alone,” holds that government should interfere as little as possible in economic affairs and leave economic decisions to the private decision making of buyers and sellers. Many governments adopted this economic philosophy starting in the middle of the nineteenth century.

Nevertheless, a century ago, the many excesses of capitalism—including monopolies and trusts, corruption, dangerous products, and poverty—led most industrialized countries to retreat from unbridled laissez-faire. Government’s role expanded steadily as it regulated businesses, levied income taxes, and pro-

vided a social safety net for the elderly, unemployed, and impoverished.

This new system, called the **welfare state**, is one in which markets direct the detailed activities of day-to-day economic life while government regulates social conditions and provides pensions, health care, and other necessities for poor families.

Conservative Backlash

Many critics of the welfare state worried that government interventions were tilting the scales in favor of *socialism*, in which the state owns, operates, and regulates much of the economy. In 1942, the great Harvard economist Joseph Schumpeter argued that the United States was “capitalism living in an oxygen tent” on its march to socialism. Capitalism’s success would breed alienation and self-doubt, sapping its efficiency and innovation.

Libertarian critics like Friedrich Hayek and Milton Friedman argued for a return to free markets and minimal government. This group argued the state is overly intrusive; governments create monopoly; government failures are just as pervasive as market failures; high taxes distort the allocation of resources; social security threatens to drain the public purse; environmental regulations dull the spirit of

enterprise; and government attempts to stabilize the economy only reduce growth and increase inflation. In short, for some, government is the problem rather than the solution.

Beginning around 1980, the tide turned as conservative governments in many countries began to reduce taxes and deregulate government's control over the economy. Many government-owned industries were privatized, income-tax rates were lowered, and the generosity of many welfare programs was reduced.

The most dramatic turn toward the market came in Russia and the socialist countries of Eastern Europe. After decades of extolling the advantages of a government-run command economy, beginning around 1990, these countries scrapped central planning and made the difficult transition to a decentralized market economy. China, while still run by the Communist party bureaucracy, has enjoyed an economic boom in the last three decades by allowing private enterprises and foreign firms to operate within its borders. Many formerly socialist regimes in India, Africa, and Latin America have embraced capitalism and reduced the role of government in their economies.

The Mixed Economy Today

In weighing the relative merits of state and market, public debate often oversimplifies the complex choices that societies face. Markets have worked miracles in some countries. But markets need well-crafted legal and

political structures, along with the social overhead capital that promotes trade and ensures a stable financial system. Without these governmental structures, markets often produce corrupt capitalism, great inequality, pervasive poverty, and declining living standards.

In economic affairs, success has many parents, while failure is an orphan. The success of market economies may lead people to overlook the important contribution of collective actions. Government programs have helped reduce poverty and malnutrition and have reduced the scourge of terrible diseases like tuberculosis and polio. Even as the world's largest economies head into a deep recession in 2008–2009, macroeconomic policies help to stem financial-market panics and reduce the length and severity of business cycles. State-supported science has split the atom, discovered the DNA molecule, and explored space.

The debate about government's successes and failures demonstrates that drawing the boundary between market and government is an enduring problem. The tools of economics are indispensable to help societies find the golden mean between an efficient market mechanism and publicly decided regulation and redistribution. The good mixed economy is, perforce, the limited mixed economy. But those who would reduce government to the constable plus a few lighthouses are living in a dream world. An efficient and humane society requires both halves of the mixed system—market and government. Operating a modern economy without both is like trying to clap with one hand.



SUMMARY

A. The Market Mechanism

1. In an economy like the United States, most economic decisions are made in markets, which are mechanisms through which buyers and sellers meet to trade and to determine prices and quantities for goods and services. Adam Smith proclaimed that the *invisible hand* of markets would lead to the optimal economic outcome as individuals pursue their own self-interest. And while markets are far from perfect, they have proved remarkably effective at solving the problems of *how*, *what*, and *for whom*.
2. The market mechanism works as follows to determine the *what* and the *how*: The dollar votes of people affect prices of goods; these prices serve as guides for the

amounts of the different goods to be produced. When people demand more of a good, its price will increase and businesses can profit by expanding production of that good. Under perfect competition, a business must find the cheapest method of production, efficiently using labor, land, and other factors; otherwise, it will incur losses and be eliminated from the market.

3. At the same time that the *what* and *how* problems are being resolved by prices, so is the problem of *for whom*. The distribution of income is determined by the ownership of factors of production (land, labor, and capital) and by factor prices. People possessing fertile land or the ability to hit home runs will earn many dollar

votes to buy consumer goods. Those without property or with skills, color, or sex that the market undervalues will receive low incomes.

B. Trade, Money, and Capital

4. As economies develop, they become more specialized. Division of labor allows a task to be broken into a number of smaller chores that can each be mastered and performed more quickly by a single worker. Specialization arises from the increasing tendency to use roundabout methods of production that require many specialized skills. As individuals and countries become increasingly specialized, they tend to concentrate on particular commodities and trade their surplus output for goods produced by others. Voluntary trade, based on specialization, benefits all.
5. Trade in specialized goods and services today relies on money to lubricate its wheels. Money is the universally acceptable medium of exchange—including primarily currency and checking deposits. It is used to pay for everything from apple tarts to zebra skins. By accepting money, people and nations can specialize in producing a few goods and can then trade them for others; without money, we would waste much time negotiating and bartering.
6. Capital goods—produced inputs such as machinery, structures, and inventories of goods in process—permit roundabout methods of production that add much to a nation's output. These roundabout methods take time and resources to get started and therefore require a temporary sacrifice of present consumption in order to increase future consumption. The rules that define how capital and other assets can be bought, sold, and used are the system of property rights. In no economic system are private-property rights unlimited.

C. The Visible Hand of Government

7. Although the market mechanism is an admirable way of producing and allocating goods, sometimes market

failures lead to deficiencies in the economic outcomes. The government may step in to correct these failures. Its role in a modern economy is to ensure efficiency, to correct an unfair distribution of income, and to promote economic growth and stability.

8. Markets fail to provide an efficient allocation of resources in the presence of imperfect competition or externalities. Imperfect competition, such as monopoly, produces high prices and low levels of output. To combat these conditions, governments regulate business behavior. Externalities arise when activities impose costs or bestow benefits that are not paid for in the marketplace. The government may decide to step in and regulate these spillovers (as it does with air pollution) or provide for public goods (as in the case of public health).
9. Markets do not necessarily produce a fair distribution of income; they may spin off unacceptably high inequality of income and consumption. In response, governments can alter the pattern of incomes (the *for whom*) generated by market wages, rents, interest, and dividends. Modern governments use taxation to raise revenues for transfers or income-support programs that place a financial safety net under the needy.
10. Since the development of macroeconomics in the 1930s, the government has undertaken a third role: using fiscal powers (of taxing and spending) and monetary policy (affecting credit and interest rates) to promote long-run economic growth and productivity and to tame the business cycle's excesses of inflation and unemployment.
11. Drawing the right boundary between market and government is an enduring problem for societies. Economics is indispensable in finding the golden mean between an efficient market and publicly decided regulation and redistribution. An efficient and humane society requires both halves of the mixed system—market and government.

CONCEPTS FOR REVIEW

The Market Mechanism

market, market mechanism
markets for goods and for factors
of production
prices as signals
market equilibrium
perfect and imperfect competition
Adam Smith's invisible-hand doctrine

Features of a Modern Economy

specialization and division of labor
money
factors of production (land, labor,
capital)
capital, private property, and property
rights

Government's Economic Role

efficiency, equity, stability
inefficiencies: monopoly and
externalities
inequity of incomes under markets
macroeconomic policies:
fiscal and monetary policies
stabilization and growth

FURTHER READING AND INTERNET WEBSITES

Further Reading

A useful discussion of globalization is contained in “Symposium on Globalization in Perspective,” *Journal of Economic Perspectives*, Fall 1998.

For examples of the writings of libertarian economists, see Milton Friedman, *Capitalism and Freedom* (University of Chicago Press, 1963), and Friedrich Hayek, *The Road to Serfdom* (University of Chicago Press, 1994).

A strong defense of government interventions is found in a history of the 1990s by Nobel Prize winner Joseph E. Stiglitz, *The Roaring Nineties: A New History of the World’s Most Prosperous Decade* (Norton, New York, 2003). Paul Krugman’s columns in *The New York Times* are a guide to current economic issues from the perspective of one of America’s most distinguished economists; his most recent book, *The Great Unraveling: Losing Our Way in the New Century* (Norton, New York, 2003), collects his columns from the early 2000s.

A fascinating example of how a small economy is organized without money is found in R. A. Radford, “The Economic

Organization of a P.O.W. Camp,” *Economica*, vol. 12, November 1945, pp. 189–201.

Websites

You can explore recent analyses of the economy along with a discussion of major economic policy issues in the *Economic Report of the President* at www.access.gpo.gov/eop/. See www.whitehouse.gov for federal budget information and as an entry point into the useful Economic Statistics Briefing Room.

The study of the iPod is Jason Dedrick, Kenneth L. Kraemer, and Greg Linden, “Who Profits from Innovation in Global Value Chains? A Study of the iPod and Notebook PCs,” available at <http://pcic.merage.uci.edu/papers/2008/WhoProfits.pdf>. Hal Varian’s review is Hal R. Varian, “An iPod Has Global Value: Ask the (Many) Countries That Make It,” *The New York Times*, June 28, 2007, available by Internet search.

QUESTIONS FOR DISCUSSION

1. What determines the composition of national output? In some cases, we say that there is “consumer sovereignty,” meaning that consumers decide how to spend their incomes on the basis of their tastes and market prices. In other cases, decisions are made by political choices of legislatures. Consider the following examples: transportation, education, police, energy efficiency of appliances, health-care coverage, television advertising. For each, describe whether the allocation is by consumer sovereignty or by political decision. Would you change the method of allocation for any of these goods?
2. When a good is limited, some means must be found to ration the scarce commodity. Some examples of rationing devices are auctions, ration coupons, and first-come, first-served systems. What are the strengths and weaknesses of each? Explain carefully in what sense a market mechanism “ration” scarce goods and services.
3. This chapter discusses many “market failures,” areas in which the invisible hand guides the economy poorly, and describes the role of government. Is it possible that there are, as well, “government failures,” government attempts to curb market failures that are worse than the original market failures? Think of some examples of government failures. Give some examples in which government failures are so bad that it is better to live with the market failures than to try to correct them.
4. Consider the following cases of government intervention: regulations to limit air pollution, income support for the poor, and price regulation of a telephone monopoly. For each case, (a) explain the market failure, (b) describe a government intervention to treat the problem, and (c) explain how “government failure” (see the definition in question 3) might arise because of the intervention.
5. The circular flow of goods and inputs illustrated in Figure 2-1 has a corresponding flow of dollar incomes and spending. Draw a circular-flow diagram for the dollar flows in the economy, and compare it with the circular flow of goods and inputs. What is the role of money in the dollar circular flow?
6. Consider three periods of American history: (a) the early 1800s, when Jones lived on an isolated farm cut off from the rest of the world; (b) the late 1940s, when Smith lived in a country where domestic trade

and exchange was extensive but international trade was cut off because of damage from World War II; and (c) 2009, when Hall lives in a globalized world that promotes trade with all countries.

Suppose you were living in each of these situations. Describe the opportunities for specialization and division of labor of Jones, Smith, and Hall. Explain how the globalized world in (c) both allows greater productivity of Hall and allows a much greater variety of consumption goods. Give specific examples in each case.

7. “Lincoln freed the slaves. With one pen stroke he destroyed much of the capital the South had accumulated over the years.” Comment.
8. The table to the right shows some of the major expenditures of the federal government. Explain how each one relates to the economic role of government.
9. Why does the saying “No taxation without representation” make sense for public goods but not private goods? Explain the mechanisms by which individuals can “protest” against (a) taxes that are thought excessive to pay for defense spending, (b) tolls that are

thought excessive to pay for a bridge, and (c) prices that are thought excessive for an airline flight from New York to Miami.

Major Expenditure Categories for Federal Government

Budget category	Federal spending, 2009 (\$, billion)
Health care	713
National defense	675
Social security	649
Income security	401
Natural resources and environment	36
International affairs	38

Source: Office of Management and Budget, *Budget of the United States Government*, Fiscal Year 2009.

Basic Elements of Supply and Demand

3



What is a cynic? A man who knows the price of everything and the value of nothing.

Oscar Wilde

The first two chapters introduced the basic problems that every economy must solve: *What* shall be produced? *How* shall goods be produced? And *for whom* should goods be produced?

We also saw that the modern mixed economy relies primarily on a system of markets and prices to solve the three central problems. Recall that the fundamental building blocks of an economy are the dual monarchy of tastes and technology. “Consumer sovereignty” operating through dollar votes determines what gets produced and where the goods go, but technologies influence costs, prices, and what goods are available. Our task in this chapter is to describe in detail how this process works in a market economy.

Markets are like the weather—sometimes stormy, sometimes calm, but always changing. Yet a careful study of markets will reveal certain forces underlying the apparently random movements. To forecast prices and outputs in individual markets, you must first master the analysis of supply and demand.

Take the example of gasoline prices, illustrated in Figure 3-1. (This graph shows the “real gasoline price,” or the price corrected for movements in the general price level.) Demand for gasoline and other oil products rose sharply after World War II as real gasoline prices fell and people moved increasingly to the suburbs. Then, in the 1970s, supply restrictions,

wars among producers, and political revolutions reduced production, with the consequent price spikes seen after 1973 and 1979. In the years that followed, a combination of energy conservation, smaller cars, the growth of the information economy, and expanded production around the world led to falling oil prices. War in Iraq and growing world demand for petroleum after 2002 produced yet further turmoil in oil markets. As Figure 3-1 shows, the real price of gasoline (in 2008 prices) fell from around \$3.50 per gallon in 1980 to around \$1.50 per gallon in the 1990s and then rose to \$4 per gallon by the summer of 2008.

What lay behind these dramatic shifts? Economics has a very powerful tool for explaining such changes in the economic environment. It is called the *theory of supply and demand*. This theory shows how consumer preferences determine consumer demand for commodities, while business costs are the foundation of the supply of commodities. The increases in the price of gasoline occurred either because the demand for gasoline had increased or because the supply of oil had decreased. The same is true for every market, from Internet stocks to diamonds to land: changes in supply and demand drive changes in output and prices. If you understand how supply and demand work, you have gone a long way toward understanding a market economy.



FIGURE 3-1. Gasoline Prices Move with Demand and Supply Changes

Gasoline prices have fluctuated sharply over the last half-century. Supply reductions in the 1970s produced two dramatic “oil shocks,” which provoked social unrest and calls for increased regulation. Reductions in demand from new energy-saving technologies led to the long decline in price after 1980. Rapid growth in world demand for oil relative to supply produced steeply growing price trends in the 2000s. The tools of supply and demand are crucial for understanding these trends.

Source: U.S. Departments of Energy and Labor. The price of gasoline has been converted into 2008 prices using the consumer price index.

This chapter introduces the notions of supply and demand and shows how they operate in competitive markets for *individual commodities*. We begin with demand curves and then discuss supply curves. Using these basic tools, we will see how the market price is determined where these two curves intersect—where the forces of demand and supply are just in balance. It is the movement of prices—the price mechanism—which brings supply and demand into balance or equilibrium. This chapter closes with some examples of how supply-and-demand analysis can be applied.

A. THE DEMAND SCHEDULE

Both common sense and careful scientific observation show that the amount of a commodity people buy depends on its price. The higher the price of an

article, other things held constant,¹ the fewer units consumers are willing to buy. The lower its market price, the more units of it are bought.

There exists a definite relationship between the market price of a good and the quantity demanded of that good, other things held constant. This relationship between price and quantity bought is called the **demand schedule**, or the **demand curve**.

Let’s look at a simple example. Table 3-1 presents a hypothetical demand schedule for cornflakes. At each price, we can determine the quantity of cornflakes that consumers purchase. For example,

¹ Later in this chapter we discuss the other factors that influence demand, including income and tastes. The term “other things held constant” simply means we are varying the price without changing any of these other determinants of demand.

Demand Schedule for Cornflakes		
	(1) Price (\$ per box) P	(2) Quantity demanded (millions of boxes per year) Q
A	5	9
B	4	10
C	3	12
D	2	15
E	1	20

TABLE 3-1. The Demand Schedule Relates Quantity Demanded to Price

At each market price, consumers will want to buy a certain quantity of cornflakes. As the price of cornflakes falls, the quantity of cornflakes demanded will rise.

at \$5 per box, consumers will buy 9 million boxes per year.

At a lower price, more cornflakes are bought. Thus, at a price of \$4, the quantity bought is 10 million boxes. At yet a lower price (P) equal to \$3, the quantity demanded (Q) is still greater, at 12 million. And so forth. We can determine the quantity demanded at each listed price in Table 3-1.

THE DEMAND CURVE

The graphical representation of the demand schedule is the *demand curve*. We show the demand curve in Figure 3-2, which graphs the quantity of cornflakes demanded on the horizontal axis and the price of cornflakes on the vertical axis. Note that quantity and price are inversely related; that is, Q goes up when P goes down. The curve slopes downward, going from northwest to southeast. This important property is called the *law of downward-sloping demand*. It is based on common sense as well as economic theory and has been empirically tested and verified for practically all commodities—cornflakes, gasoline, college education, and illegal drugs being a few examples.

Law of downward-sloping demand: When the price of a commodity is raised (and other things are held constant), buyers tend to buy less of the commodity. Similarly, when the price is lowered,

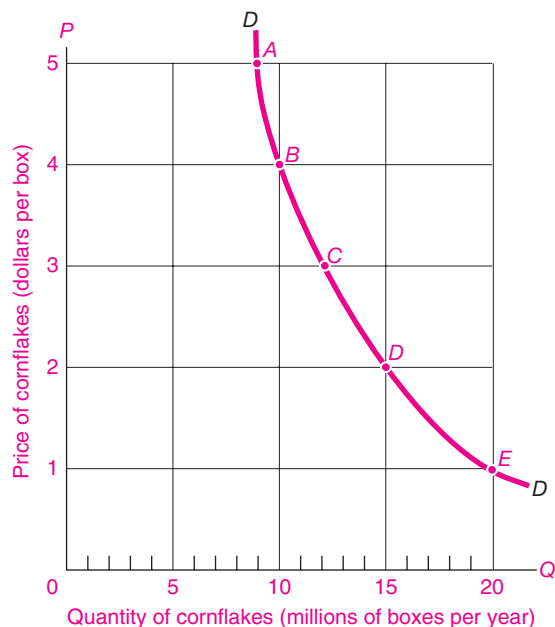


FIGURE 3-2. A Downward-Sloping Demand Curve Relates Quantity Demanded to Price

In the demand curve for cornflakes, price (P) is measured on the vertical axis while quantity demanded (Q) is measured on the horizontal axis. Each pair of (P , Q) numbers from Table 3-1 is plotted as a point, and then a smooth curve is passed through the points to give us a demand curve, DD . The negative slope of the demand curve illustrates the law of downward-sloping demand.

other things being constant, quantity demanded increases.

Quantity demanded tends to fall as price rises for two reasons:

1. First is the **substitution effect**, which occurs because a good becomes relatively more expensive when its price rises. When the price of good A rises, I will generally substitute goods B, C, D, . . . for it. For example, as the price of beef rises, I eat more chicken.
2. A higher price generally also reduces quantity demanded through the **income effect**. This comes into play because when a price goes up, I find myself somewhat poorer than I was before. If gasoline prices double, I have in effect less real income, so I will naturally curb my consumption of gasoline and other goods.

Market Demand

Our discussion of demand has so far referred to “the” demand curve. But whose demand is it? Mine? Yours? Everybody’s? The fundamental building block for demand is individual preferences. However, in this chapter we will always focus on the *market demand*, which represents the sum total of all individual demands. The market demand is what is observable in the real world.

The market demand curve is found by adding together the quantities demanded by all individuals at each price.

Does the market demand curve obey the law of downward-sloping demand? It certainly does. If prices drop, for example, the lower prices attract new customers through the substitution effect. In addition, a price reduction will induce extra purchases of goods by existing consumers through both the income and the substitution effects. Conversely, a rise in the price of a good will cause some of us to buy less.



The Explosive Growth in Computer Use

We can illustrate the law of downward-sloping demand for the case of personal computers (PCs). The prices of the first PCs were high, and their computing power was relatively modest. They were found in few businesses and even fewer homes. It is hard to believe that just 20 years ago students wrote most of their papers in longhand and did most calculations by hand or with simple calculators!

But the prices of computing power fell sharply over the last four decades. As the prices fell, new buyers were enticed to buy their first computers. PCs came to be widely used for work, for school, and for fun. In the 2000s, as the value of computers increased with the development of the Internet, including video and personal Web pages, yet more people jumped on the computer bandwagon. Worldwide, PC sales totaled around 250 million in 2007.

Figure 3-3 shows the prices and quantities of computers and peripheral equipment in the United States as calculated by government statisticians. The prices reflect the cost of purchasing computers with constant quality—that is, they take into account the rapid quality change of the average computer purchased. You can see how falling prices along with improved software, increased utility of the Internet and e-mail, and other factors have led to an explosive growth in computer output.

Forces behind the Demand Curve

What determines the market demand curve for cornflakes or gasoline or computers? A whole array of factors influences how much will be demanded at a given price: average levels of income, the size of the population, the prices and availability of related goods, individual and social tastes, and special influences.

- The *average income* of consumers is a key determinant of demand. As people’s incomes rise, individuals tend to buy more of almost everything, even if prices don’t change. Automobile purchases tend to rise sharply with higher levels of income.
- The *size of the market*—measured, say, by the population—clearly affects the market demand curve. California’s 40 million people tend to buy 40 times more apples and cars than do Rhode Island’s 1 million people.
- The prices and availability of *related goods* influence the demand for a commodity. A particularly important connection exists among substitute goods—ones that tend to perform the same function, such as cornflakes and oatmeal, pens and pencils, small cars and large cars, or oil and natural gas. Demand for good A tends to be low if the price of substitute product B is low. (For example, as computer prices fell, what do you think happened to the demand for typewriters?)
- In addition to these objective elements, there is a set of subjective elements called *tastes* or *preferences*. Tastes represent a variety of cultural and historical influences. They may reflect genuine psychological or physiological needs (for liquids, love, or excitement). And they may include artificially contrived cravings (for cigarettes, drugs, or fancy sports cars). They may also contain a large element of tradition or religion (eating beef is popular in America but taboo in India, while curried jellyfish is a delicacy in Japan but would make many Americans gag).
- Finally, *special influences* will affect the demand for particular goods. The demand for umbrellas is high in rainy Seattle but low in sunny Phoenix; the demand for air conditioners will rise in hot weather; the demand for automobiles will be low in New York, where public transportation is plentiful and parking is a nightmare.

The determinants of demand are summarized in Table 3-2, which uses automobiles as an example.

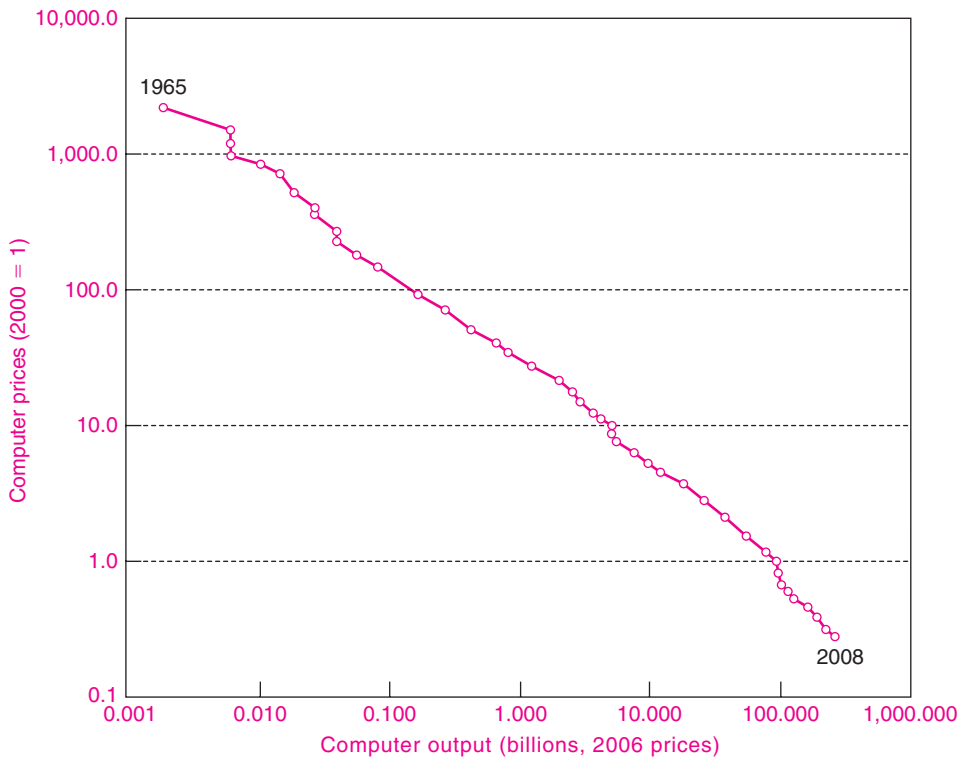


FIGURE 3-3. Declining Computer Prices Have Fueled an Explosive Growth in Computer Power

The prices of computers and peripheral devices are measured in terms of the cost of purchasing a given bundle of characteristics (such as memory or speed of calculations). The real price of computer power has fallen by a factor of 8000 since 1965. Falling prices along with higher incomes and a growing variety of uses have led to a 140,000-fold growth in the quantity of computers (or, really, computational power) produced.

Source: Department of Commerce estimates of real output and prices. Note that the data are plotted on ratio scales.

Factors affecting the demand curve	Example for automobiles
1. Average income	As incomes rise, people increase car purchases.
2. Population	A growth in population increases car purchases.
3. Prices of related goods	Lower gasoline prices raise the demand for cars.
4. Tastes	Having a new car becomes a status symbol.
5. Special influences	Special influences include availability of alternative forms of transportation, safety of automobiles, expectations of future price increases, etc.

TABLE 3-2. Many Factors Affect the Demand Curve

Shifts in Demand

As economic life evolves, demand changes incessantly. Demand curves sit still only in textbooks.

Why does the demand curve shift? Because influences other than the good's price change. Let's work through an example of how a change in a nonprice variable shifts the demand curve. We know that the average income of Americans rose sharply during the long economic boom of the 1990s. Because there is a powerful income effect on the demand for automobiles, this means that the quantity of automobiles demanded at each price will rise. For example, if average incomes rose by 10 percent, the quantity demanded at a price of \$10,000 might rise from 10 million to 12 million units. This would be a shift in the demand curve because the increase in quantity demanded reflects factors other than the good's own price.

The net effect of the changes in underlying influences is what we call an *increase in demand*. An increase in the demand for automobiles is illustrated in Figure 3-4 as a rightward shift in the demand

curve. Note that the shift means that more cars will be bought at every price.

You can test yourself by answering the following questions: Will a warm winter shift the demand curve for heating oil leftward or rightward? Why? What will happen to the demand for baseball tickets if young people lose interest in baseball and watch basketball instead? What will a sharp fall in the price of personal computers do to the demand for typewriters? What happens to the demand for a college education if wages are falling for blue-collar jobs while salaries for college-educated workers are rising rapidly?

When there are changes in factors other than a good's own price which affect the quantity purchased, we call these changes shifts in demand. Demand increases (or decreases) when the quantity demanded at each price increases (or decreases).

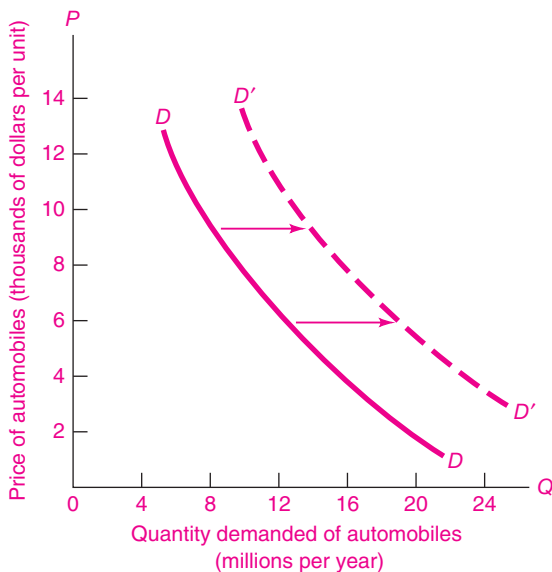


FIGURE 3-4. Increase in Demand for Automobiles

As elements underlying demand change, the demand for automobiles is affected. Here we see the effect of rising average income, increased population, and lower gasoline prices on the demand for automobiles. We call this shift of the demand curve an increase in demand.



Movements along Curves versus Shifts of Curves

One of the most important points that you must understand in economics is the difference between movements along a curve and shifts of a curve. In the present case, do not confuse a *change in demand* (which denotes a *shift* of the demand curve) with a *change in the quantity demanded* (which means *moving along*, or moving to a different point, on the same demand curve after a price change).

A change in demand occurs when one of the elements underlying the demand curve shifts. Take the case of pizzas. Suppose incomes increase and people want to spend part of their extra income on pizzas for a given pizza price. In other words, higher incomes will increase demand and shift the demand curve for pizzas out and to the right. This is a shift in the demand for pizzas.

By contrast, suppose that a new technology reduces pizza costs and prices. This leads to a change in quantity demanded that occurs because consumers tend to buy more pizzas as pizza prices fall, all other things remaining constant. Here, the increased purchases result not from an increase in demand but from the pizza-price decrease. This change represents a *movement along* the demand curve, not a *shift of* the demand curve.

B. THE SUPPLY SCHEDULE

Let us now turn from demand to supply. The supply side of a market typically involves the terms on which businesses produce and sell their products. The supply of tomatoes tells us the quantity of tomatoes that will be sold at each tomato price. More precisely, the supply schedule relates the quantity supplied of a good to its market price, other things constant. In considering supply, the other things that are held constant include input prices, prices of related goods, and government policies.

The **supply schedule** (or **supply curve**) for a commodity shows the relationship between its market price and the amount of that commodity that producers are willing to produce and sell, other things held constant.

THE SUPPLY CURVE

Table 3-3 shows a hypothetical supply schedule for cornflakes, and Figure 3-5 plots the data from the table in the form of a supply curve. These data show that at a cornflakes price of \$1 per box, no cornflakes at all will be produced. At such a low price, breakfast cereal manufacturers might want to devote their factories to producing other types of cereal, like bran flakes, that earn them more profit than cornflakes. As the price of cornflakes increases, ever more cornflakes will be produced. At ever-higher cornflakes prices, cereal makers will find it profitable to add more workers and to buy more automated cornflakes-stuffing machines and even more cornflakes factories. All these will increase the output of cornflakes at the higher market prices.

Figure 3-5 shows the typical case of an upward-sloping supply curve for an individual commodity. One important reason for the upward slope is “the law of diminishing returns” (a concept we will learn more about later). Wine will illustrate this important law. If society wants more wine, then additional labor will have to be added to the limited land sites suitable for producing wine grapes. Each new worker will be adding less and less extra product. The price needed to coax out additional wine output is therefore higher. By raising the price of wine, society can persuade wine producers to produce and sell more

Supply Schedule for Cornflakes		
	(1) Price (\$ per box) P	(2) Quantity supplied (millions of boxes per year) Q
A	5	18
B	4	16
C	3	12
D	2	7
E	1	0

TABLE 3-3. Supply Schedule Relates Quantity Supplied to Price

The table shows, for each price, the quantity of cornflakes that cereal makers want to produce and sell. Note the positive relation between price and quantity supplied.

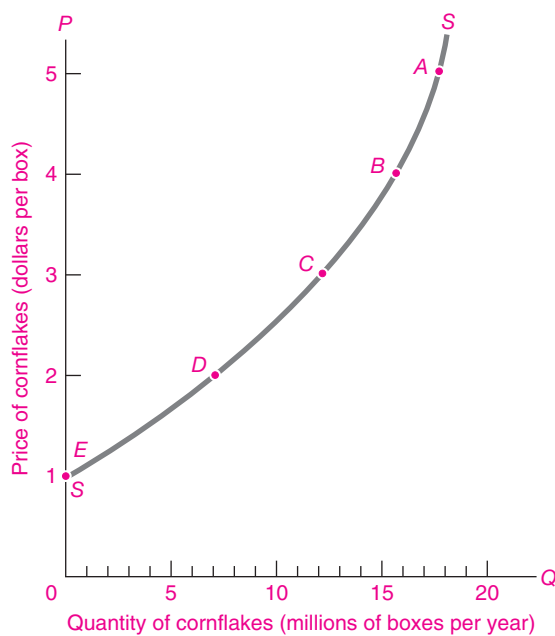


FIGURE 3-5. Supply Curve Relates Quantity Supplied to Price

The supply curve plots the price and quantity pairs from Table 3-3. A smooth curve is passed through these points to give the upward-sloping supply curve, SS .

wine; the supply curve for wine is therefore upward-sloping. Similar reasoning applies to many other goods as well.

Forces behind the Supply Curve

In examining the forces determining the supply curve, the fundamental point to grasp is that producers supply commodities for profit and not for fun or charity. One major element underlying the supply curve is the *cost of production*. When production costs for a good are low relative to the market price, it is profitable for producers to supply a great deal. When production costs are high relative to price, firms produce little, switch to the production of other products, or may simply go out of business.

Production costs are primarily determined by the *prices of inputs* and *technological advances*. The prices of inputs such as labor, energy, or machinery obviously have a very important influence on the cost of producing a given level of output. For example, when oil prices rose sharply in 2007, the increase raised the price of energy for manufacturers, increased their production costs, and lowered their supply. By contrast, as computer prices fell over the last three decades, businesses increasingly substituted computerized processes for other inputs, as for example in payroll or accounting operations; this increased supply.

An equally important determinant of production costs is *technological advances*, which consist of changes that lower the quantity of inputs needed to produce the same quantity of output. Such advances include everything from scientific breakthroughs to better application of existing technology or simply reorganization of the flow of work. For example, manufacturers have become much more efficient in recent years. It takes far fewer hours of labor to produce an automobile today than it did just 10 years ago. This advance enables car makers to produce more automobiles at the same cost. To give another example, if Internet commerce allows firms to compare more easily the prices of necessary inputs, that will lower the cost of production.

But production costs are not the only ingredient that goes into the supply curve. Supply is also influenced by the *prices of related goods*, particularly goods that are alternative outputs of the production process. If the price of one production substitute rises, the supply of another substitute will decrease. An interesting example occurred in U.S. farming. The government has raised the subsidy on automotive ethanol to reduce imports of foreign oil. Ethanol is today primarily made from corn. The increased

demand for corn (a shift in the demand curve for corn) increased the corn price. As a result, farmers planted corn instead of soybeans. The net result was that the supply of soybeans declined and soybean prices rose. All of this occurred because of a subsidy to reduce oil imports.

Government policy also has an important impact on the supply curve. We just discussed the case of ethanol subsidies and corn production. Environmental and health considerations determine what technologies can be used, while taxes and minimum-wage laws can significantly affect input prices. Government trade policies have a major impact upon supply. For instance, when a free-trade agreement opens up the U.S. market to Mexican footwear, the total supply of footwear in the United States increases.

Finally, *special influences* affect the supply curve. The weather exerts an important influence on farming and on the ski industry. The computer industry has been marked by a keen spirit of innovation, which has led to a continuous flow of new products. Market structure will affect supply, and expectations about future prices often have an important impact upon supply decisions.

Table 3-4 highlights the important determinants of supply, using automobiles as an example.

Shifts in Supply

Businesses are constantly changing the mix of products and services they provide. What lies behind these changes in supply behavior?

When changes in factors other than a good's own price affect the quantity supplied, we call these changes shifts in supply. Supply increases (or decreases) when the amount supplied increases (or decreases) at each market price.

When automobile prices change, producers change their production and quantity supplied, but the supply and the supply curve do not shift. By contrast, when other influences affecting supply change, supply changes and the supply curve shifts.

We can illustrate a shift in supply for the automobile market. Supply would increase if the introduction of cost-saving computerized design and manufacturing reduced the labor required to produce cars, if autoworkers took a pay cut, if there were lower production costs in Japan, or if the government repealed environmental regulations on the

Factors affecting the supply curve	Example for automobiles
1. Technology	Computerized manufacturing lowers production costs and increases supply.
2. Input prices	A reduction in the wage paid to autoworkers lowers production costs and increases supply.
3. Prices of related goods	If truck prices fall, the supply of cars rises.
4. Government policy	Removing quotas and tariffs on imported automobiles increases total automobile supply.
5. Special influences	Internet shopping and auctions allow consumers to compare the prices of different dealers more easily and drives high-cost sellers out of business.

TABLE 3-4. Supply Is Affected by Production Costs and Other Factors

industry. Any of these elements would increase the supply of automobiles in the United States at each price. Figure 3-6 illustrates an increase in the supply of automobiles.

To test your understanding of supply shifts, think about the following: What would happen to the world

supply curve for oil if a revolution in Saudi Arabia led to declining oil production? What would happen to the supply curve for clothing if tariffs were slapped on Chinese imports into the United States? What happens to the supply curve for computers if Intel introduces a new computer chip that dramatically increases computing speeds?

As you answer the questions above, make sure to keep in mind the difference between moving along a curve and a shift of the curve. Here that distinction applies to supply curves, whereas earlier we applied it to demand curves. Look back at the gasoline-price curve in Figure 3-1 on page 46. When the price of oil rose because of political disturbances in the 1970s, this led to an inward *shift* of the supply curve. When sales of gasoline declined in response to the higher price, that was a *movement along* the demand curve.

Does the history of computer prices and quantities shown in Figure 3-3 on page 49 look more like shifting supply or shifting demand? (Question 8 at the end of this chapter explores this issue further.)

How would you describe a rise in chicken production that was induced by a rise in chicken prices? What about the case of a rise in chicken production because of a fall in the price of chicken feed?

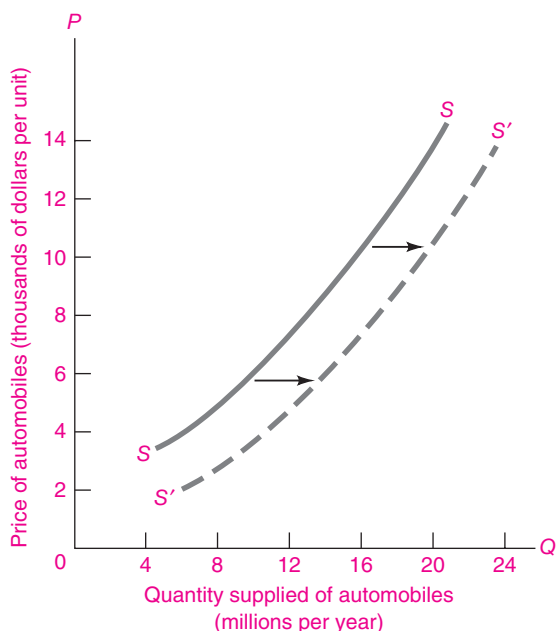


FIGURE 3-6. Increased Supply of Automobiles

As production costs fall, the supply of automobiles increases. At each price, producers will supply more automobiles, and the supply curve therefore shifts to the right. (What would happen to the supply curve if Congress were to put a restrictive quota on automobile imports?)

C. EQUILIBRIUM OF SUPPLY AND DEMAND

Up to this point we have been considering demand and supply in isolation. We know the amounts that are willingly bought and sold at each price. We have

seen that consumers demand different amounts of cornflakes, cars, and computers as a function of these goods' prices. Similarly, producers willingly supply different amounts of these and other goods depending on their prices. But how can we put both sides of the market together?

The answer is that supply and demand interact to produce an equilibrium price and quantity, or a market equilibrium. The *market equilibrium* comes at that price and quantity where the forces of supply and demand are in balance. At the equilibrium price, the amount that buyers want to buy is just equal to the amount that sellers want to sell. The reason we call this an equilibrium is that, when the forces of supply and demand are in balance, there is no reason for price to rise or fall, as long as other things remain unchanged.

Let us work through the cornflakes example in Table 3-5 to see how supply and demand determine a market equilibrium; the numbers in this table come from Tables 3-1 and 3-3. To find the market price and quantity, we find a price at which the amounts desired to be bought and sold just match. If we try a price of \$5 per box, will it prevail for long? Clearly not. As row A in Table 3-5 shows, at \$5 producers would like to sell 18 million boxes per year while demanders want to buy only 9. The amount supplied at \$5 exceeds the amount demanded, and stocks of cornflakes pile up in supermarkets. Because too few consumers are chasing too many cornflakes, the

price of cornflakes will tend to fall, as shown in column (5) of Table 3-5.

Say we try \$2. Does that price clear the market? A quick look at row D shows that at \$2 consumption exceeds production. Cornflakes begin to disappear from the stores at that price. As people scramble around to find their desired cornflakes, they will tend to bid up the price of cornflakes, as shown in column (5) of Table 3-5.

We could try other prices, but we can easily see that the equilibrium price is \$3, or row C in Table 3-5. At \$3, consumers' desired demand exactly equals producers' desired production, each of which is 12 units. Only at \$3 will consumers and suppliers both be making consistent decisions.

A market equilibrium comes at the price at which quantity demanded equals quantity supplied. At that equilibrium, there is no tendency for the price to rise or fall. The equilibrium price is also called the **market-clearing price**. This denotes that all supply and demand orders are filled, the books are "cleared" of orders, and demanders and suppliers are satisfied.

EQUILIBRIUM WITH SUPPLY AND DEMAND CURVES

We often show the market equilibrium through a supply-and-demand diagram like the one in Figure 3-7; this figure combines the supply curve from Figure 3-5

Combining Demand and Supply for Cornflakes					
	(1) Possible price (\$ per box)	(2) Quantity demanded (millions of boxes per year)	(3) Quantity supplied (millions of boxes per year)	(4) State of market	(5) Pressure on price
A	5	9	18	Surplus	↓ Downward
B	4	10	16	Surplus	↓ Downward
C	3	12	12	Equilibrium	Neutral
D	2	15	7	Shortage	↑ Upward
E	1	20	0	Shortage	↑ Upward

TABLE 3-5. Equilibrium Price Comes Where Quantity Demanded Equals Quantity Supplied

The table shows the quantities supplied and demanded at different prices. Only at the equilibrium price of \$3 per box does amount supplied equal amount demanded. At too low a price there is a shortage and price tends to rise. Too high a price produces a surplus, which will depress the price.

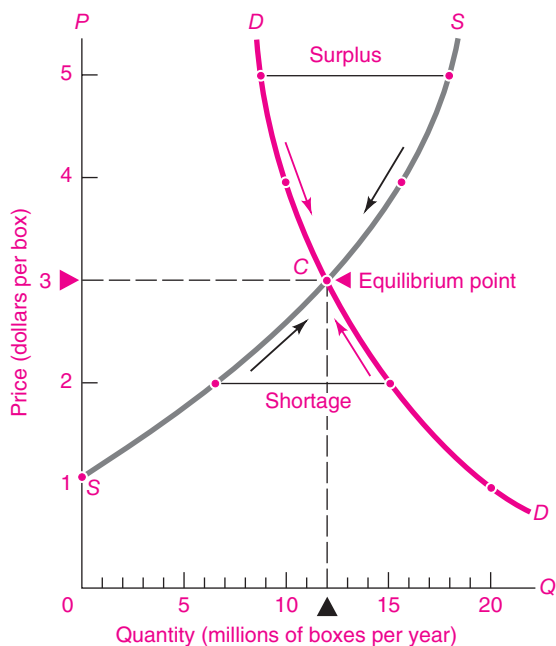


FIGURE 3-7. Market Equilibrium Comes at the Intersection of Supply and Demand Curves

The market equilibrium price and quantity come at the intersection of the supply and demand curves. At a price of \$3, at point C, firms willingly supply what consumers willingly demand. When the price is too low (say, at \$2), quantity demanded exceeds quantity supplied, shortages occur, and the price is driven up to equilibrium. What occurs at a price of \$4?

with the demand curve from Figure 3-2. Combining the two graphs is possible because they are drawn with exactly the same variables and units on each axis.

We find the market equilibrium by looking for the price at which quantity demanded equals quantity supplied. *The equilibrium price comes at the intersection of the supply and demand curves, at point C.*

How do we know that the intersection of the supply and demand curves is the market equilibrium? Let us repeat our earlier experiment. Start with the initial high price of \$5 per box, shown at the top of the price axis in Figure 3-7. At that price, suppliers want to sell more than demanders want to buy. The result is a *surplus*, or excess of quantity supplied over quantity demanded, shown in the figure by the blue line labeled “Surplus.” The arrows along the curves show the direction that price tends to move when a market is in surplus.

At a low price of \$2 per box, the market shows a *shortage*, or excess of quantity demanded over quantity supplied, here shown by the blue line labeled “Shortage.” Under conditions of shortage, the competition among buyers for limited goods causes the price to rise, as shown in the figure by the arrows pointing upward.

We now see that the balance or equilibrium of supply and demand comes at point C, where the supply and demand curves intersect. At point C, where the price is \$3 per box and the quantity is 12 units, the quantities demanded and supplied are equal: there are no shortages or surpluses; there is no tendency for price to rise or fall. At point C and only at point C, the forces of supply and demand are in balance and the price has settled at a sustainable level.

The equilibrium price and quantity come where the amount willingly supplied equals the amount willingly demanded. In a competitive market, this equilibrium is found at the intersection of the supply and demand curves. There are no shortages or surpluses at the equilibrium price.

Effect of a Shift in Supply or Demand

The analysis of the supply-and-demand apparatus can do much more than tell us about the equilibrium price and quantity. It can also be used to predict the impact of changes in economic conditions on prices and quantities. Let’s change our example to the staff of life, bread. Suppose that a spell of bad weather raises the price of wheat, a key ingredient of bread. That shifts the supply curve for bread to the left. This is illustrated in Figure 3-8(a), where the bread supply curve has shifted from SS to $S'S'$. In contrast, the demand curve has not shifted because people’s sandwich demand is unaffected by farming weather.

What happens in the bread market? The bad harvest causes profit-maximizing bakers to produce less bread at the old price, so quantity demanded exceeds quantity supplied. The price of bread therefore rises, encouraging production and thereby raising quantity supplied, while simultaneously discouraging consumption and lowering quantity demanded. The price continues to rise until, at the new equilibrium price, the amounts demanded and supplied are once again equal.

As Figure 3-8(a) shows, the new equilibrium is found at E' , the intersection of the new supply curve

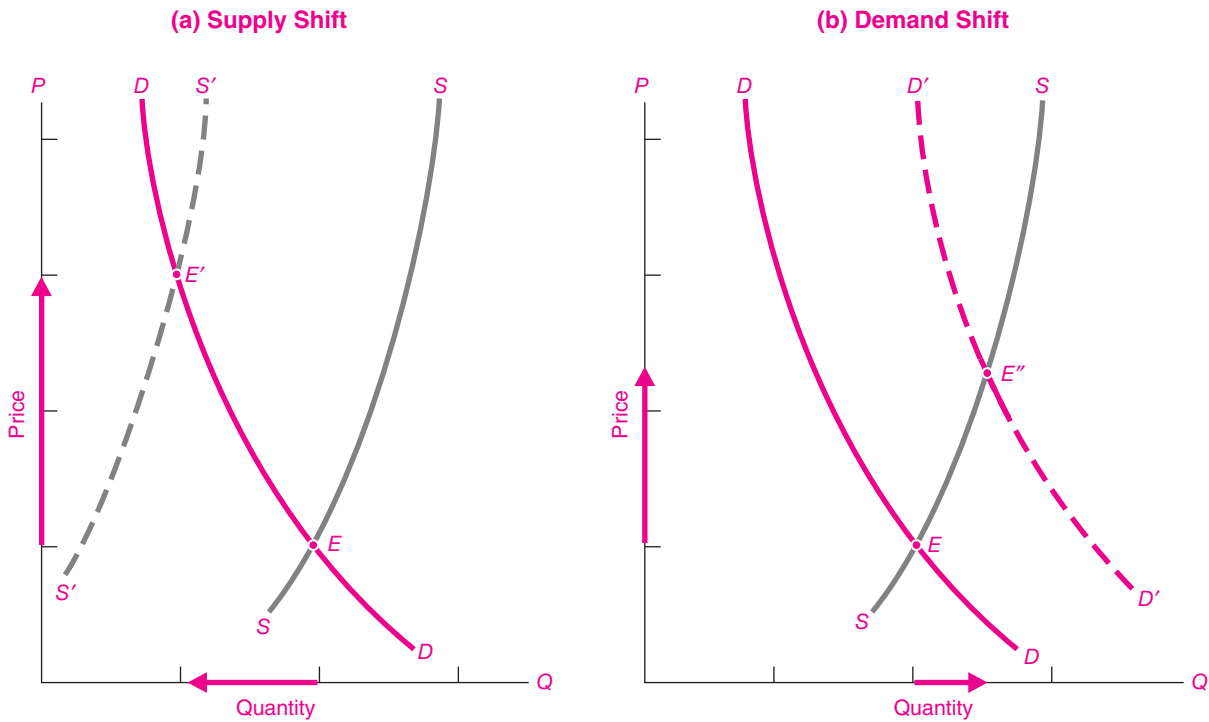


FIGURE 3-8. Shifts in Supply or Demand Change Equilibrium Price and Quantity

(a) If supply shifts leftward, a shortage will develop at the original price. Price will be bid up until quantities willingly bought and sold are equal, at new equilibrium E' . (b) A shift in the demand curve leads to excess demand. Price will be bid up as equilibrium price and quantity move upward to E'' .

$S'S'$ and the original demand curve. Thus a bad harvest (or any leftward shift of the supply curve) raises prices and, by the law of downward-sloping demand, lowers quantity demanded.

Suppose that new baking technologies lower costs and therefore increase supply. That means the supply curve shifts down and to the right. Draw in a new $S''S''$ curve, along with the new equilibrium E'' . Why is the equilibrium price lower? Why is the equilibrium quantity higher?

We can also use our supply-and-demand apparatus to examine how changes in demand affect the market equilibrium. Suppose that there is a sharp increase in family incomes, so everyone wants to eat more bread. This is represented in Figure 3-8(b) as a “demand shift” in which, at every price, consumers demand a higher quantity of bread. The demand curve thus shifts *rightward* from DD to $D'D'$.

The demand shift produces a shortage of bread at the old price. A scramble for bread ensues. Prices are bid upward until supply and demand come back into balance at a higher price. Graphically, the increase in demand has changed the market equilibrium from E to E'' in Figure 3-8(b).

For both examples of shifts—a shift in supply and a shift in demand—a variable underlying the demand or supply curve has changed. In the case of supply, there might have been a change in technology or input prices. For the demand shift, one of the influences affecting consumer demand—incomes, population, the prices of related goods, or tastes—changed and thereby shifted the demand schedule (see Table 3-6).

When the elements underlying demand or supply change, this leads to shifts in demand or supply and to changes in the market equilibrium of price and quantity.

	Demand and supply shifts	Effect on price and quantity
If demand rises . . .	The demand curve shifts to the right, and . . .	Price ↑ Quantity ↑
If demand falls . . .	The demand curve shifts to the left, and . . .	Price ↓ Quantity ↓
If supply rises . . .	The supply curve shifts to the right, and . . .	Price ↓ Quantity ↑
If supply falls . . .	The supply curve shifts to the left, and . . .	Price ↑ Quantity ↓

TABLE 3-6. The Effect on Price and Quantity of Different Demand and Supply Shifts

Interpreting Changes in Price and Quantity

An important issue that arises is how to interpret price and quantity changes. We sometimes hear, “Gasoline demand does not obey the law of downward-sloping demand. From 2003 to 2006 prices rose sharply [as shown in Figure 3-1], yet U.S. gasoline consumption went up rather than down. What do you economists say about that!”

We cannot provide a definitive explanation without a careful look at the forces affecting both supply and demand. But the most likely explanation for the paradox is that the rise in gasoline prices over this period was due to *shifts in demand* rather than *movements along the demand curve*. We know, for example, that the Chinese and Indian economies grew rapidly and their oil imports added to world demand. Moreover, the number of automobiles in the United States grew sharply, and the fuel efficiency of the fleet declined, increasing the U.S. demand for gasoline.

Economists deal with these sorts of questions all the time. When prices or quantities change in a market, does the situation reflect a change on the supply side or the demand side? Sometimes, in simple situations, looking at price and quantity simultaneously gives you a clue about whether it is the supply curve or the demand curve that has shifted. For example, a rise in the price of bread accompanied by a *decrease* in quantity suggests that the supply curve has shifted to the left (a decrease in supply). A rise in price accompanied by an *increase* in quantity indicates that the demand curve for bread has probably shifted to the right (an increase in demand).

Figure 3-9 illustrates the point. In both panel (a) and panel (b), quantity goes up. But in (a) the price rises, and in (b) the price falls. Figure 3-9(a) shows the case of an increase in demand, or a shift in the demand curve. As a result of the shift, the equilibrium quantity demanded increases from 10 to 15 units. The case of a movement along the demand curve is shown in Figure 3-9(b). In this case, a supply shift changes the market equilibrium from point E to point E'' . As a result, the quantity demanded changes from 10 to 15 units. But demand does not change in this second case; rather, quantity demanded increases as consumers move along their demand curve from E to E'' in response to a price change.

Return to our example of the change in gasoline consumption from 2003 to 2006. Explain why such events are best explained by the changes in Figure 3-9(a). Explain why the law of downward-sloping demand is still alive in the gasoline market!



The Elusive Concept of Equilibrium

The notion of equilibrium is one of the most elusive concepts of economics. We are familiar with equilibrium in our everyday lives from seeing, for example, an orange sitting at the bottom of a bowl or a pendulum at rest. In economics, equilibrium means that the different forces operating on a market are in balance, so the resulting price and quantity reconcile the desires of purchasers and suppliers. Too low a price means that the forces are not in balance, that the forces attracting demand are greater than the forces attracting supply, so there is excess demand, or a shortage. We also

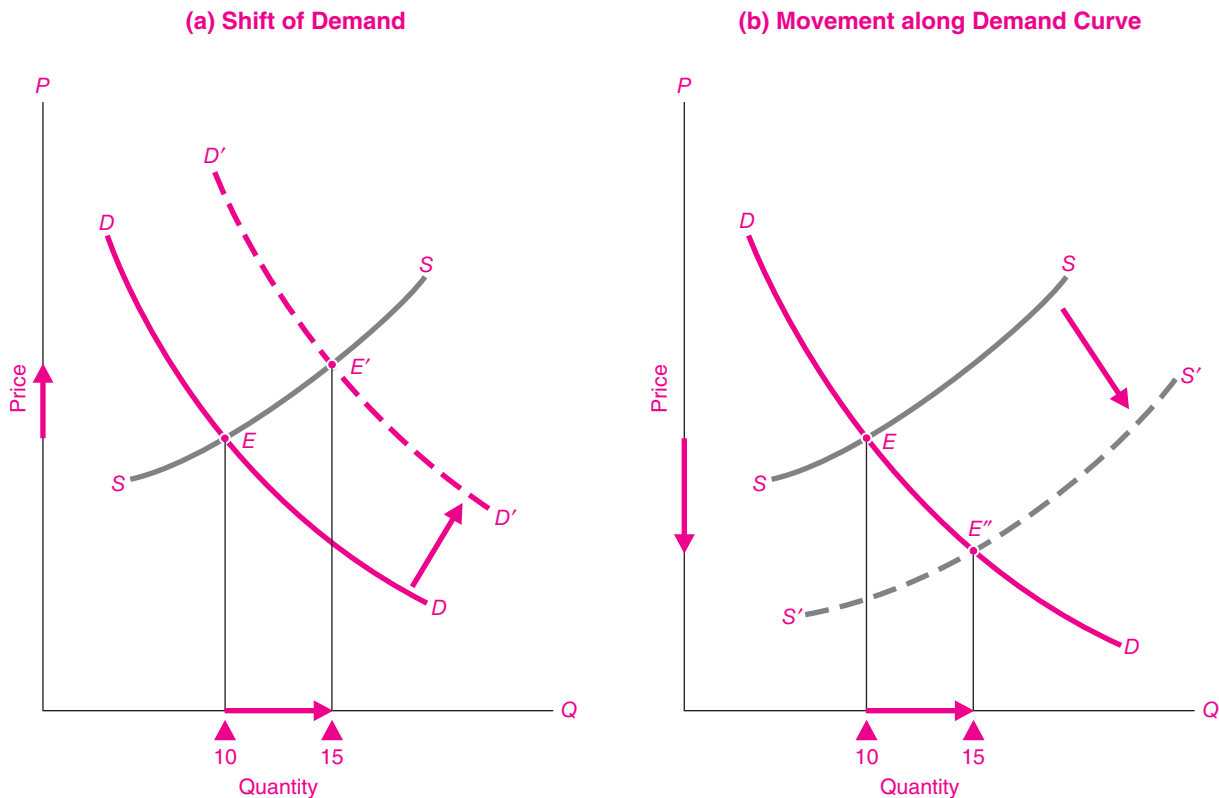


FIGURE 3-9. Shifts of and Movements along Curves

Start out with initial equilibrium at E and a quantity of 10 units. In (a), an increase in demand (i.e., a shift of the demand curve) produces a new equilibrium of 15 units at E' . In (b), a shift in supply results in a movement along the demand curve from E to E'' .

know that a competitive market is a mechanism for producing equilibrium. If the price is too low, demanders will bid up the price to the equilibrium level.

The notion of equilibrium is tricky, however, as is seen by the statement of a leading pundit: "Don't lecture me about supply and demand equilibrium. The supply of oil is always equal to the demand for oil. You simply can't tell the difference." The pundit is right in an accounting sense. Clearly the oil sales recorded by the oil producers should be exactly equal to the oil purchases recorded by the oil consumers. But this bit of arithmetic cannot repeal the laws of supply and demand. More important, if we fail to understand the nature of economic equilibrium, we cannot hope to understand how different forces affect the marketplace.

In economics, we are interested in knowing the quantity of sales that will clear the market, that is, the equilibrium quantity. We also want to know the price at which

consumers willingly buy what producers willingly sell. Only at this price will both buyers and sellers be satisfied with their decisions. Only at this price and quantity will there be no tendency for price and quantity to change.

Only by looking at the equilibrium of supply and demand can we hope to understand such paradoxes as the fact that immigration may not lower wages in the affected cities, that land taxes do not raise rents, and that bad harvests raise (yes, raise!) the incomes of farmers.

Supply, Demand, and Immigration

A fascinating and important example of supply and demand, full of complexities, is the role of immigration in determining wages. If you ask people, they are likely to tell you that immigration into California or Florida surely lowers the wages of people in those

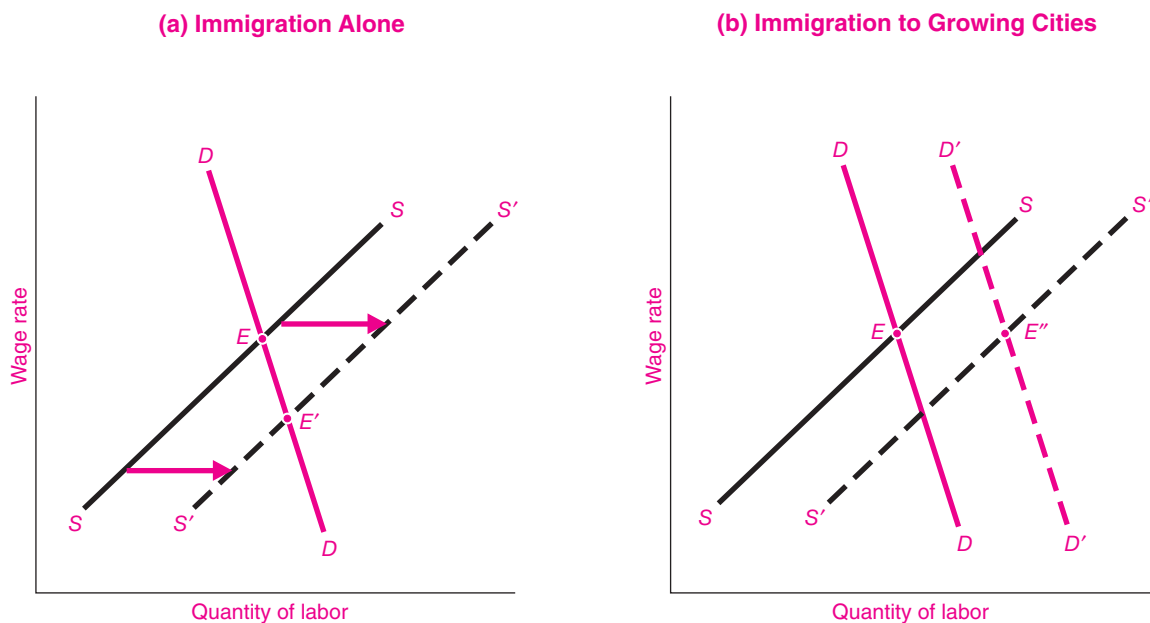


FIGURE 3-10. Impact of Immigration on Wages

In (a), new immigrants cause the supply curve for labor to shift from SS to $S'S'$, lowering equilibrium wages. But more often, immigrants go to cities with growing labor markets. Then, as shown in (b), the wage changes are small if the supply increase comes in labor markets with growing demand.

regions. It's just supply and demand. They might point to Figure 3-10(a), which shows a supply-and-demand analysis of immigration. According to this analysis, immigration into a region shifts the supply curve for labor to the right and pushes down wages.

Careful economic studies cast doubt on this simple reasoning. A survey of the evidence concludes:

[The] effect of immigration on the labor market outcomes of natives is small. There is no evidence of economically significant reductions in native employment. Most empirical analysis . . . finds that a 10 percent increase in the fraction of immigrants in the population reduces native wages by at most 1 percent.²

How can we explain the small impact of immigration on wages? Labor economists emphasize the high geographic mobility of the American population. This means that new immigrants will quickly spread around

the entire country. Once they arrive, immigrants may move to cities where they can get jobs—workers tend to move to those cities where the demand for labor is already rising because of a strong local economy.

This point is illustrated in Figure 3-10(b), where a shift in labor supply to $S'S'$ is associated with a higher demand curve, $D'D'$. The new equilibrium wage at E'' is the same as the original wage at E . Another factor is that native-born residents may move out when immigrants move in, so the total supply of labor is unchanged. This would leave the supply curve for labor in its original position and leave the wage unchanged.

Immigration is a good example for demonstrating the power of the simple tools of supply and demand.

RATIONING BY PRICES

Let us now take stock of what the market mechanism accomplishes. By determining the equilibrium prices and quantities, the market allocates or rations out the scarce goods of the society among the possible

² Rachel M. Friedberg and Jennifer Hunt, "The Impact of Immigrants on Host Country Wages, Employment, and Growth," *Journal of Economic Perspectives*, Spring 1995, pp. 23–44.

uses. Who does the rationing? A planning board? Congress? The president? No. The marketplace, through the interaction of supply and demand, does the rationing. This is *rationing by the purse*.

What goods are produced? This is answered by the signals of market prices. High corn prices stimulate corn production, whereas falling computer prices stimulate a growing demand for computation. Those who have the most dollar votes have the greatest influence on what goods are produced.

For whom are goods produced? The power of the purse dictates the distribution of income and consumption. Those with higher incomes end up with larger houses, fancier cars, and longer vacations. When backed up by cash, the most urgently felt needs get fulfilled through the demand curve.

Even the *how* question is decided by supply and demand. When corn prices are high, farmers buy expensive tractors and more fertilizer and invest in irrigation systems. When oil prices are high, oil companies drill in deep offshore waters and employ novel seismic techniques to find oil.

With this introduction to supply and demand, we begin to see how desires for goods, as expressed through demands, interact with costs of goods, as reflected in supplies. Further study will deepen our understanding of these concepts and will show how these tools can be applied to other important areas. But even this first survey will serve as an indispensable tool for interpreting the economic world in which we live.



SUMMARY

1. The analysis of supply and demand shows how a market mechanism solves the three problems of *what*, *how*, and *for whom*. A market blends together demands and supplies. Demand comes from consumers who are spreading their dollar votes among available goods and services, while businesses supply the goods and services with the goal of maximizing their profits.
2. A demand schedule shows the relationship between the quantity demanded and the price of a commodity, other things held constant. Such a demand schedule, depicted graphically by a demand curve, holds constant other things like family incomes, tastes, and the prices of other goods. Almost all commodities obey the *law of downward-sloping demand*, which holds that quantity demanded falls as a good's price rises. This law is represented by a downward-sloping demand curve.
3. Many influences lie behind the demand schedule for the market as a whole: average family incomes, population, the prices of related goods, tastes, and special influences. When these influences change, the demand curve will shift.
4. The supply schedule (or supply curve) gives the relationship between the quantity of a good that producers desire to sell—other things constant—and that good's price. Quantity supplied generally responds positively to price, so the supply curve is upward-sloping.
5. Elements other than the good's price affect its supply. The most important influence is the commodity's production cost, determined by the state of technology and by input prices. Other elements in supply include the prices of related goods, government policies, and special influences.
6. The equilibrium of supply and demand in a competitive market occurs when the forces of supply and demand are in balance. The equilibrium price is the price at which the quantity demanded just equals the quantity supplied. Graphically, we find the equilibrium at the intersection of the supply and demand curves. At a price above the equilibrium, producers want to supply more than consumers want to buy, which results in a surplus of goods and exerts downward pressure on price. Similarly, too low a price generates a shortage, and buyers will therefore tend to bid price upward to the equilibrium.
7. Shifts in the supply and demand curves change the equilibrium price and quantity. An increase in demand, which shifts the demand curve to the right, will increase both equilibrium price and quantity. An increase in supply, which shifts the supply curve to the right, will decrease price and increase quantity demanded.
8. To use supply-and-demand analysis correctly, we must (a) distinguish a change in demand or supply (which produces a shift of a curve) from a change in the

C. Equilibrium of Supply and Demand

quantity demanded or supplied (which represents a movement along a curve); (b) hold other things constant, which requires distinguishing the impact of a change in a commodity's price from the impact of changes in other influences; and (c) look always for

the supply-and-demand equilibrium, which comes at the point where forces acting on price and quantity are in balance.

9. Competitively determined prices ration the limited supply of goods among those who demand them.

CONCEPTS FOR REVIEW

supply-and-demand analysis
demand schedule or curve, *DD*
law of downward-sloping demand
influences affecting demand curve

supply schedule or curve, *SS*
influences affecting supply curve
equilibrium price and quantity
shifts of supply and demand curves

all other things held constant
rationing by prices

FURTHER READING AND INTERNET WEBSITES

Further Reading

Supply-and-demand analysis is the single most important and useful tool in microeconomics. Supply-and-demand analysis was developed by the great British economist Alfred Marshall in *Principles of Economics*, 9th ed. (New York, Macmillan, [1890] 1961). To reinforce your understanding, you might look in textbooks on intermediate microeconomics. Two good references are Hal R. Varian, *Intermediate Microeconomics: A Modern Approach*, 6th ed. (Norton, New York, 2002), and Edwin Mansfield and Gary Yohe, *Microeconomics: Theory and Applications*, 10th ed. (Norton, New York, 2000).

A recent survey of the economic issues in immigration is in George Borjas, *Heaven's Door: Immigration Policy and the American Economy* (Princeton University Press, Princeton, N.J., 1999).

Websites

Websites in economics are proliferating rapidly, and it is hard to keep up with all the useful sites. A good place to start is always rfe.org/. A good starting point for multiple sites in economics is rfe.org/OtherInt/MultSub/index.html, and the Google search engine has its own economics site at directory.google.com/Top/Science/Social_Sciences/Economics/. Another useful starting point for Internet resources in economics can be found at www.oswego.edu/~economic/econweb.htm.

You can examine a recent study of the impact of immigration on American society from the National Academy of Sciences, *The New Americans* (1997), at www.nap.edu. This site provides free access to over 1000 studies from economics and the other social and natural sciences.

QUESTIONS FOR DISCUSSION

1. a. Define carefully what is meant by a demand schedule or curve. State the law of downward-sloping demand. Illustrate the law of downward-sloping demand with two cases from your own experience.
b. Define the concept of a supply schedule or curve. Show that an increase in supply means a rightward and downward shift of the supply curve. Contrast this with the rightward and upward shift of the demand curve implied by an increase in demand.
2. What might increase the demand for hamburgers? What would increase the supply? What would inexpensive frozen pizzas do to the market equilibrium for hamburgers? To the wages of teenagers who work at McDonald's?
3. Explain why the price in competitive markets settles down at the equilibrium intersection of supply and demand. Explain what happens if the market price starts out too high or too low.

4. Explain why each of the following is *false*:
- A freeze in Brazil's coffee-growing region will lower the price of coffee.
 - "Protecting" American textile manufacturers from Chinese clothing imports will lower clothing prices in the United States.
 - The rapid increase in college tuitions will lower the demand for college.
 - The war against drugs will lower the price of domestically produced marijuana.
5. The following are four laws of supply and demand. Fill in the blanks. Demonstrate each law with a supply-and-demand diagram.
- An increase in demand generally raises price and raises quantity demanded.
 - A decrease in demand generally _____ price and _____ quantity demanded.
 - An increase in supply generally lowers price and raises quantity demanded.
 - A decrease in supply generally _____ price and _____ quantity demanded.
6. For each of the following, explain whether quantity demanded changes because of a demand shift or a price change, and draw a diagram to illustrate your answer:
- As a result of increased military spending, the price of Army boots rises.
 - Fish prices fall after the pope allows Catholics to eat meat on Friday.
 - An increase in gasoline taxes lowers the consumption of gasoline.
 - After the Black Death struck Europe in the fourteenth century, wages rose.
7. Examine the graph for the price of gasoline in Figure 3-1, on page 46. Then, using a supply-and-demand diagram, illustrate the impact of each of the following on price and quantity demanded:
- Improvements in transportation lower the costs of importing oil into the United States in the 1960s.
 - After the 1973 war, oil producers cut oil production sharply.
 - After 1980, smaller automobiles get more miles per gallon.
 - A record-breaking cold winter in 1995–1996 unexpectedly raises the demand for heating oil.
 - Rapid economic growth in the early 2000s leads to a sharp upturn in oil prices.
8. Examine Figure 3-3 on page 49. Does the price-quantity relationship look more like a supply curve or a demand curve? Assuming that the demand curve was unchanged over this period, trace supply curves for 1965 and 2008 that would have generated the (P, Q) pairs for those years. Explain what forces might have led to the shift in the supply curve.
9. From the following data, plot the supply and demand curves and determine the equilibrium price and quantity:

Supply and Demand for Pizzas

Price (\$ per pizza)	Quantity demanded (pizzas per semester)	Quantity supplied (pizzas per semester)
10	0	40
8	10	30
6	20	20
4	30	10
2	40	0
0	125	0

What would happen if the demand for pizzas tripled at each price? What would occur if the price were initially set at \$4 per pizza?