

The Role and Method of Economics

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section

Economics: A Brief Introduction

1.1

- What is economics?
- Why study economics?
- What distinguishes macroeconomics from microeconomics?

WHAT IS ECONOMICS?

Some individuals think economics involves the study of the stock market and corporate finance, and it does—in part. Others think that economics is concerned with the wise use of money and other matters of personal finance, and it is—in part. Still others think that economics involves forecasting or predicting what business conditions will be like in the future, and again, it does—in part.

Growing Wants and Scarce Resources

Precisely defined, **economics** is the study of the allocation of our limited resources to satisfy our unlimited wants. **Resources** are inputs—such as land, human effort and skills, and machines and factories—used to produce goods and services. The problem is that our wants exceed our limited resources, a fact that we call *scarcity*. Scarcity forces us to make choices on how to best use our limited resources. This is **the economic problem**: Scarcity forces us to choose, and choices are costly because we must give up other opportunities that we value. This economizing problem is evident in every aspect of our lives. Choosing between a trip to the grocery store or the mall, or between finishing an assignment or going to a movie, can be understood more easily when one has a good handle on the “economic way of thinking.”

Economics Is All Around Us

Although many things that we desire in life are considered to be “noneconomic,” economics concerns anything that is considered worthwhile to some human being. For instance, love, sexual activity, and religion have value for most people. Even these have an

economics

the study of the allocation of our limited resources to satisfy our unlimited wants

resources

inputs used to produce goods and services

the economic problem

scarcity forces us to choose, and choices are costly because we must give up other opportunities that we value



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The front pages of our daily newspapers are filled with articles related to economics—either directly or indirectly. News headlines might read: Gasoline Prices Soar; Stocks Rise; Stocks Fall; Prime Minister Vows to Increase National Defence Spending; Health-Care Costs Continue to Rise.

economic dimension. Consider religion, for example. Concern for spiritual matters has led to the development of institutions such as churches, mosques, and temples that provide religious and spiritual services. These services are goods that many people desire. Love and sex likewise have received economists' scrutiny. One product of love, the institution of the family, is an important economic decision-making unit. Also, sexual activity results in the birth of children, one of the most important "goods" that humans desire.

Even time has an economic dimension. In fact, perhaps the most precious single resource is time. We all have the same limited amount of time per day, and how we divide our time between work and leisure (including perhaps study, sleep, exercise, etc.) is a distinctly economic matter. If we choose more work, we must sacrifice leisure. If we choose to study, we must sacrifice time with friends, or time spent sleeping or watching TV. Virtually everything we decide to do, then, has an economic dimension.

Living in a world of scarcity means trade-offs. And it is important that we know what these trade-offs are so we can make better choices about the options available to us.

WHY STUDY ECONOMICS?

Among the many good reasons to study economics, perhaps the best reason is that so many of the things of concern in the world around us are at least partly economic in character. A quick look at newspaper headlines reveals the vast range of problems that are related to economics—global warming, health care, education, and social assistance. The study of economics improves your understanding of these concerns. A student of economics becomes aware that, at a basic level, much of economic life involves choosing among alternative possible courses of action—making choices between our conflicting wants and desires in a world of scarcity. Economics provides some clues as to how to intelligently evaluate these options and determine the most appropriate choices in given situations. But economists learn quickly that there are seldom easy, clear-cut solutions to the problems we face: The easy problems were solved long ago!

Many students take introductory college-level economics courses because these are part of the core curriculum requirements. But why do the committees that establish these requirements include economics? In part, economics helps develop a disciplined method of thinking about problems as opposed to simply memorizing solutions. The problem-solving tools you will develop by studying economics will prove valuable to you in both your personal and professional life, regardless of your career choice. In short, the study of economics provides a systematic, disciplined way of thinking.

Using This Stuff

The basic tools of economics are valuable to people in all walks of life and in all career paths. Newspaper reporters benefit from economics, because the problem-solving perspective it teaches trains them to ask intelligent questions whose answers will better inform their readers. Engineers, architects, and contractors usually have alternative ways to build. Architects learn to combine technical expertise and artistry with the limitations imposed by finite resources. That is, they learn how to evaluate their options from an economic perspective. Business owners face similar problems, because costs are a constraint in both creating and marketing a new product. Will the added cost of developing a new and improved product be outweighed by the added sales revenues that are expected to result? Economists can, however, pose these questions and provide criteria that business owners can use in evaluating the appropriateness of one design as compared to another. The point is that the economic way of thinking causes those in many types of fields to ask the right kind of questions.

WHAT DISTINGUISHES MACROECONOMICS FROM MICROECONOMICS?

Like psychology, sociology, anthropology, and political science, economics is considered a social science. Economics, like the other social sciences, is concerned with reaching generalizations about human behaviour. Economics is the study of people. It is the social science that studies the choices people make in a world of limited resources.

Economics and the other social sciences often complement one another. For example, a political scientist might examine the process that led to the adoption of a certain tax policy, whereas an economist might analyze the impact of that tax policy. Or, whereas a psychologist may try to figure out what makes the criminal mind work, an economist might study the factors causing a change in the crime rate. Social scientists, then, may be studying the same issue but from different perspectives.

Conventionally, we distinguish two main branches of economics: macroeconomics and microeconomics. **Macroeconomics** is the study of the **aggregate** or total economy; it looks at economic problems as they influence the whole of society. Topics covered in macroeconomics include discussions of inflation, unemployment, business cycles, and economic growth. **Microeconomics** is the study of the smaller units within the economy. Topics include the decision-making behaviour of firms and households and their interaction in markets for particular goods or services. Microeconomic topics also include discussions of health care, agricultural subsidies, the price of everyday items such as running shoes, the distribution of income, and the impact of labour unions on wages. To put it simply, microeconomics looks at the trees whereas macroeconomics looks at the forest.

macroeconomics

the study of the aggregate economy including the topics of inflation, unemployment, and economic growth

aggregate

the total amount—such as the aggregate level of output

microeconomics

the study of the smaller units within the economy including the topics of household and firm behaviour and how they interact in the marketplace

SECTION CHECK

- Economics is the study of the allocation of our limited resources to satisfy our unlimited wants.
- Economics is a problem-solving science that teaches you how to ask intelligent questions.
- Macroeconomics deals with the aggregate, or total, economy, while microeconomics focuses on smaller units within the economy.

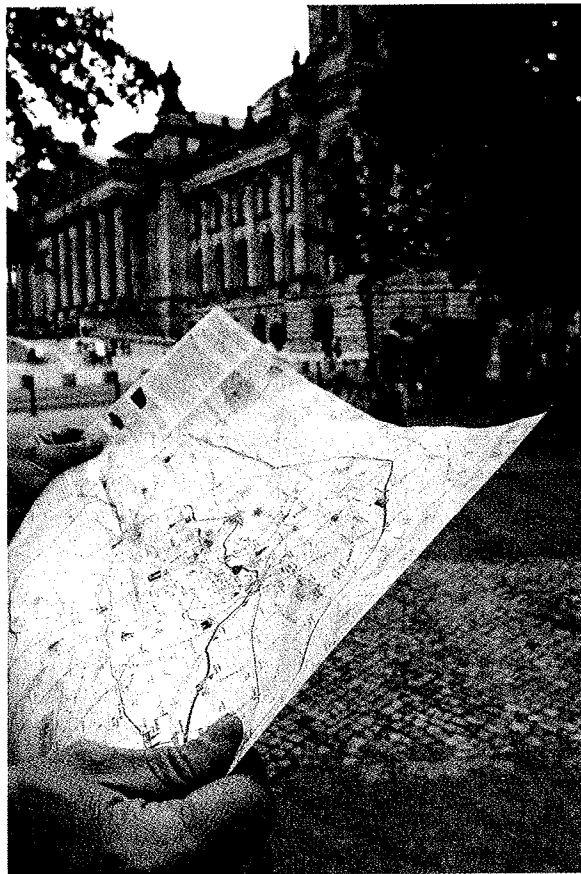
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Economic Theory

- What are economic theories?
- Why do we need to abstract?
- What is a hypothesis?
- What is the *ceteris paribus* assumption?
- Why are observations and predictions harder in the social sciences?
- What distinguishes between correlation and causation?
- What is the fallacy of composition?
- What are positive analysis and normative analysis?
- Why do economists disagree?

How is economic theory like a map? Because of the complexity of human behaviour, economists must abstract to focus on the most important components of a particular problem. This is similar to maps that highlight the important information (and assume away many minor details) to help people get from here to there.



WHAT ARE ECONOMIC THEORIES?

A **theory** is an established explanation that accounts for known facts or phenomena. Specifically, economic theories are statements or propositions about patterns of human behaviour that are expected to take place under certain circumstances. These theories help us to sort out and understand the complexities of economic behaviour. We expect a good theory to explain and predict well. A good economic theory, then, should help us to better understand and, ideally, predict human economic behaviour.

WHY DO WE NEED TO ABSTRACT?

Economic theories cannot realistically include every event that has ever occurred. This is true for

the same reason that a newspaper or history book does not include every world event that has ever happened. We must abstract. A road map of Canada may not include every creek, ridge, and valley between Calgary and Halifax—indeed, such an all-inclusive map would be too large to be of value. However, a small road map with major details will provide enough information to travel by car from Calgary to Halifax. Likewise, an economic theory provides a broad view, not a detailed examination, of human economic behaviour.

theory

an established explanation that accounts for known facts or phenomena

WHAT IS A HYPOTHESIS?

The beginning of any theory is a **hypothesis**, a testable proposition that makes some type of prediction about behaviour in response to certain changes in conditions. In economic theory, a hypothesis is a testable prediction about how people will behave or react to a change in economic circumstances. For example, if the price of compact discs (CDs) increased, we might hypothesize that fewer CDs would be sold, or if the price of CDs fell, we might hypothesize that more CDs would be sold. Once a hypothesis is stated, it is tested by comparing what it predicts will happen to what actually happens.

hypothesis

a testable proposition

Using Empirical Analysis

To see if a hypothesis is valid, we must engage in an **empirical analysis**. That is, we must examine the data to see if the hypothesis fits well with the facts. If the hypothesis is consistent with real-world observations, it is accepted; if it does not fit well with the facts, it is “back to the drawing board.”

empirical analysis

the examination of data to see if the hypothesis fits well with the facts

Determining whether a hypothesis is acceptable is more difficult in economics than it is in the natural or physical sciences. Chemists, for example, can observe chemical reactions under laboratory conditions. They can alter the environment to meet the assumptions of the hypothesis and can readily manipulate the variables (chemicals, temperatures, and so on) crucial to the proposed relationship. Such controlled experimentation is seldom possible in economics. The laboratory of economists is usually the real world. Unlike a chemistry lab, economists cannot easily control all the other variables that might influence human behaviour.

From Hypothesis to Theory

After gathering their data, economic researchers must then evaluate the results to determine whether the hypothesis is supported or refuted. If supported, the hypothesis can then be tentatively accepted as an economic theory.

Economic theories are always on probation. A hypothesis is constantly being tested against empirical findings. Do the observed findings support the prediction? When a hypothesis survives a number of tests, it is accepted until it no longer predicts well.

WHAT IS THE *CETERIS PARIBUS* ASSUMPTION?

Virtually all economic theories share a condition usually expressed by use of the Latin expression *ceteris paribus*. This roughly means “let everything else be equal” or “holding everything else constant.” In trying to assess the effect of one variable on another, we must isolate their relationship from other events that might also influence the situation that the theory tries to explain or predict. To make this clearer, we will illustrate this concept with a couple of examples.

ceteris paribus
holding everything else
constant

Suppose you develop your own theory describing the relationship between studying and exam performance: If I study harder, I will perform better on the test. That sounds logical, right? Holding other things constant (*ceteris paribus*), this is likely to be true. However, what if you studied harder but inadvertently overslept the day of the exam? What if you were so sleepy during the test that you could not think clearly? Or what if you studied the wrong material? Although it may look as if additional studying did not improve your performance, the real problem may lie in the impact of other variables, such as sleep deficiency or how you studied.

WHY ARE OBSERVATIONS AND PREDICTIONS HARDER IN THE SOCIAL SCIENCES?

Working from observations, scientists try to make generalizations that will enable them to predict certain events. However, observation and prediction are more difficult in the social sciences than in physical sciences such as chemistry, physics, and astronomy. Why? The major reason for the difference is that the social scientists, including economists, are concerned with *human* behaviour. And human behaviour is more variable and often less readily predictable than the behaviour of experiments observed in a laboratory. However, by looking at the actions of a large group of people, economists can still make many reliable predictions about human behaviour.

Economists Predict on a Group Level

Economists' predictions usually refer to the collective behaviour of large groups rather than to that of specific individuals. Why is this? Looking at the behaviours of a large group allows economists to discern general patterns of actions. For example, consider

what would happen if the price of air travel from Canada to Europe was drastically reduced, say from \$1500 to \$500, because of the invention of a more fuel-efficient jet. What type of predictions could we make about the effect of this price reduction on the buying habits of typical consumers?

Individual Behaviour

Let's look first at the responses of individuals. As a result of the price drop, some people will greatly increase their intercontinental travel, taking theatre weekends in London or week-long trips to France to indulge in French food. Some people, however, are terribly afraid to fly, and a price reduction will not influence their behaviour in the slightest. Others might detest Europe and, despite the lowered airfares, prefer to spend a few days in Vancouver, British Columbia, instead. A few people might respond to the airfare reduction in precisely the opposite way from ours: At the lower fare, they might make fewer trips to Europe, because they might believe (rightly or wrongly) that the price drop would be accompanied by a reduction in the quality of service, greater crowding, or reduced safety. In short, we cannot predict with any level of certainty how a given individual will respond to this airfare reduction.

Group Behaviour

Group behaviour is often more predictable than individual behaviour. When the weather gets colder, more firewood is sold. Some individuals may not buy firewood (e.g., if they don't have a fireplace in their home), but we can predict with great accuracy that a group of individuals will establish a pattern of buying more firewood. Similarly, while we cannot say what each individual will do, within a group of persons, we can predict with great accuracy that more flights to Europe from Toronto will be sold at lower prices, holding other things such as income and preferences constant. We cannot predict exactly how many more airline tickets will be sold at \$500 than at \$1500, but we can predict the direction of the impact and approximate the extent of the impact. By observing the relationship between the price of goods and services and the quantities people purchase in different places and during different time periods, it is possible to make some reliable generalizations about how much people will react to changes in the prices of goods and services. Economists use this larger picture of the group for most of their theoretical analysis.

WHAT DISTINGUISHES BETWEEN CORRELATION AND CAUSATION?

Without a theory of causation, no scientist could sort out and understand the enormous complexity of the real world. But one must always be careful not to confuse correlation with causation. In other words, the fact that two events usually occur together (**correlation**) does not necessarily mean that one caused the other to occur (**causation**). For example, say a groundhog awakes after a long winter of hibernation, climbs out of his hole, sees his shadow, and then six weeks of bad weather ensue. Did the groundhog cause the bad weather? It is highly unlikely.

Perhaps the causality may run in the opposite direction. Although a rooster may always crow before the sun rises, it does not cause the sunrise; rather, the early light from the sunrise causes the rooster to crow.

The Positive Correlation between Ice Cream Sales and Crime

Did you know that when ice cream sales rise, so do crime rates? What do you think causes the two events to occur together? Some might think that the sugar "high" in the ice cream

correlation

two events that usually occur together

causation

when one event causes another event to occur

causes the higher crime rate. Excess sugar in a snack was actually used in court testimony in a murder case—the so-called “Twinkie defence.” However, it is more likely that crime peaks in the summer because of weather, more people on vacation (leaving their homes vacant), teenagers out of school, and so on. It just happens that ice cream sales also peak in those months because of weather. The lesson: One must always be careful not to confuse correlation with causation and to be clear on the direction of the causation.

WHAT IS THE FALLACY OF COMPOSITION?

One must also be careful with problems associated with aggregation (summing up all the parts), particularly the **fallacy of composition**. This fallacy states that even if something is true for an individual, it is not necessarily true for many individuals as a group. For example, say you are at a concert and you decide to stand up to get a better view of the stage. This works as long as no one else stands up. But what would happen if everyone stood up at the same time? Then, standing up would not let you see better. Hence, what may be true for an individual does not always hold true in the aggregate. The same can be said of arriving to class early to get a better parking place—what if everyone arrived early? Or studying harder to get a better grade in a class that is graded on a curve—what if everyone studied harder? All of these are examples of the fallacy of composition.

WHAT ARE POSITIVE ANALYSIS AND NORMATIVE ANALYSIS?

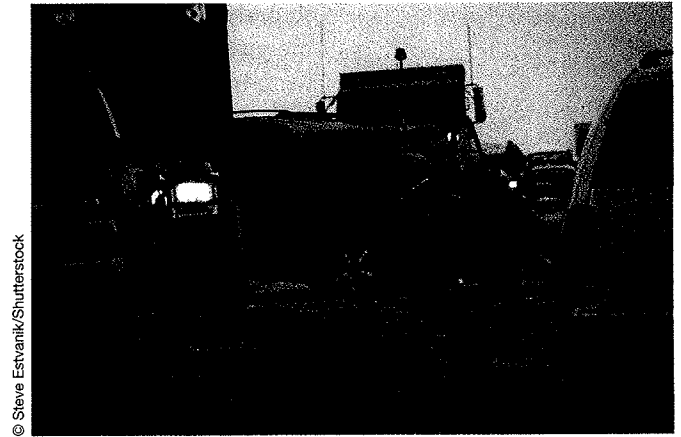
Positive Analysis

Most economists view themselves as scientists seeking the truth about the way people behave. They make speculations about economic behaviour, and then (ideally) they try to assess the validity of those predictions based on human experience. Their work emphasizes how people *do* behave, rather than how people *should* behave. In the role of scientist, an economist tries to observe, objectively, patterns of behaviour without reference to the appropriateness or inappropriateness of that behaviour. This objective, value-free approach, utilizing the scientific method, is called **positive analysis**. In positive analysis, we want to know the impact of variable A on variable B. We want to be able to test a hypothesis. For example, the following is a positive statement: If rent controls are imposed, vacancy rates will fall. This statement is testable. A positive statement does not have to be a true statement, but it does have to be a testable statement.

However, keep in mind that it is doubtful that even the most objective scientist can be totally value-free in his or her analysis. An economist may well emphasize data or evidence that supports his hypothesis, putting less weight on other evidence that might be contradictory. This, alas, is human nature. But a good economist/scientist strives to be as fair and objective as possible in evaluating evidence and in stating conclusions based on the evidence.

Normative Analysis

Like everyone, economists have opinions and make value judgments. When economists, or anyone else for that matter, express opinions about some economic policy or statement, they are indicating in part how they believe things should be, not just facts as to the way things are. **Normative analysis** is a subjective, biased approach, where one expresses opinions about the desirability of various actions. Normative statements involve judgments about what should be or what ought to happen. For example, one could judge that incomes



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People tend to drive slower when the roads are covered with ice. In addition, more traffic accidents occur when the roads are icy. So, does driving slower cause the number of accidents to rise? No, it is the icy roads that lead to both lower speeds and increased accidents.

fallacy of composition

even if something is true for an individual, it is not necessarily true for a group

positive analysis

an objective, value-free approach, utilizing the scientific method

normative analysis

a subjective, biased approach

should be more equally distributed. If there is a change in tax policy that makes incomes more equal, there will be positive economic questions that can be investigated, such as how work behaviour will change. But we cannot say, as scientists, that such a policy is good or bad; rather, we can point to what will likely happen if the policy is adopted.

Positive versus Normative Statements

The distinction between positive and normative analysis is important. It is one thing to say that everyone should have universal health care, a normative statement, and quite another to say that universal health care would lead to greater worker productivity, a testable positive statement. It is important to distinguish between positive and normative analysis because many controversies in economics revolve around policy considerations that contain both. When economists start talking about how the economy should work rather than how it does work, they have entered the normative world of the policymaker.

WHY DO ECONOMISTS DISAGREE?

Although economists differ frequently on economic policy questions, there is probably less disagreement than the media would have you believe. Disagreement is common in most disciplines: Seismologists differ over predictions of earthquakes or volcanic eruption; historians can be at odds over the interpretation of historical events; psychologists disagree on proper ways to rear children; and nutritionists debate the merits of large doses of vitamin C.

The majority of disagreements in economics stem from normative issues, as differences in values or policy beliefs result in conflict. As we discussed earlier in this chapter, economists may emphasize specific facts over other facts when trying to develop support for their own hypothesis. As a result, disagreements can result when one economist gives weight to facts that have been minimized by another, and vice versa.

Freedom versus Fairness

Some economists are concerned about individual freedom and liberty, thinking that any encroachment on individual decision making is, other things equal, bad. People with this philosophic bent are inclined to be skeptical of any increased government involvement in the economy.

On the other hand, some economists are concerned with what they consider an unequal, "unfair," or unfortunate distribution of income, wealth, or power, and view governmental intervention as desirable in righting injustices that they believe exist in a market economy. To these persons, the threat to individual liberty alone is not sufficiently great to reject governmental intervention in the face of perceived economic injustice.

The Validity of an Economic Theory

Aside from philosophic differences, there is a second reason why economists may differ on any given policy question. Specifically, they may disagree as to the validity of a given economic theory for the policy in question. Suppose two economists have identical philosophical views that have led them to the same conclusion: To end injustice and hardship, unemployment should be reduced. To reach the objective, the first economist believes the government should lower taxes and increase spending, whereas the second economist believes increasing the amount of money in public hands by various banking policies will achieve the same results with fewer undesirable consequences. The two economists differ because the empirical evidence for economic theories about the cause of unemployment appears to conflict. Some evidence suggests government taxation and spending policies are effective in reducing unemployment, whereas other evidence suggests that the prime cause of unnecessary unemployment lies with faulty monetary policy. Still other evidence

is consistent with the view that, over long periods, neither approach mentioned here is of much value in reducing unemployment, and that unemployment will be part of our existence no matter what macroeconomic policies we follow.

Economists Do Agree

Although you may not believe it after reading the previous discussion, economists don't always disagree. In fact, according to a survey among members of the American Economic Association, most economists agree on a wide range of issues, including rent control, import tariffs, export restrictions, the use of wage and price controls to curb inflation, and the minimum wage.

SECTION CHECK

- Economic theories are statements used to explain and predict patterns of human behaviour.
- Economic theories, through abstraction, provide a broad view of human economic behaviour.
- A hypothesis makes a prediction about human behaviour and is then tested.
- In order to isolate the effects of one variable on another, we use the *ceteris paribus* assumption.
- With its focus on human behaviour, which is more variable and less predictable, observation and prediction are more difficult in the social sciences.
- The fact that two events are related does not mean that one caused the other to occur.
- What is true for the individual is not necessarily true for the group.
- Positive analysis is objective and value-free, while normative analysis involves value judgements and opinions about the desirability of various actions.
- Most disagreement among economists stems from normative issues.

section

1.3

Scarcity

- What is scarcity?
- What are goods and services?

Most of economics is really knowing certain principles well and knowing when and how to apply them. In the following sections, some important tools are presented that will help you understand the economic way of thinking. These few basic ideas will repeatedly occur throughout the text. If you develop a good understanding of these principles and master the problem-solving skills inherent in them, they will serve you well for the rest of your life.

WHAT IS SCARCITY?

As we have already mentioned, economics is concerned primarily with **scarcity**—the situation that exists when human wants exceed available resources. We may want more “essential” items like food, clothing, schooling, and health care. We may want many other

scarcity
the situation exists when
human wants exceed available
resources

items, like vacations, cars, computers, and concert tickets. We may want more friendship, love, knowledge, and so on. We also may have many goals—perhaps an A in this class, a university education, and a great job. Unfortunately, people are not able to fulfill all of their wants—material desires and nonmaterial desires. And as long as human wants exceed available resources, scarcity will exist.

Scarcity and Resources

The scarce resources used in the production of goods and services can be grouped into four categories: labour, land, capital, and entrepreneurship.

Labour is the total of both physical and mental effort used by people in the production of goods and services.

Land includes the “gifts of nature” or the natural resources used in the production of goods and services. Trees, animals, water, minerals, and so on are all considered to be “land” for our purposes, along with the physical space normally thought of as land.

Capital is the equipment and structures used to produce goods and services. Office buildings, tools, machines, and factories are all considered capital goods. When we invest in factories, machines, research and development, or education, we increase the potential to create more goods and services in the future. Capital also includes **human capital**, the productive knowledge and skills people receive from education and on-the-job training.

Entrepreneurship is the process of combining labour, land, and capital together to produce goods and services. Entrepreneurs make the tough and risky decisions about what and how to produce goods and services. Entrepreneurs are always looking for new ways to improve production techniques or to create new products. They are lured by the chance to make a profit. It is this opportunity to make a profit that leads entrepreneurs to take risks.

However, entrepreneurs are not necessarily a Bill Gates (Microsoft), an Elizabeth Arden (cosmetics empire), or a Paul Desmarais (Power Corporation). In some sense, we are all entrepreneurs when we try new products or when we find better ways to manage our households or our study time. Rather than money, then, our profits might take the form of greater enjoyment, additional time for recreation, or better grades.

WHAT ARE GOODS AND SERVICES?

Goods are those items that we value or desire. Goods tend to be tangible—objects that can be seen, held, heard, tasted, or smelled. **Services** are intangible acts for which people are willing to pay, such as legal services, medical services, and dental care. Services are intangible because they are less overtly visible, but they are certainly no less valuable than goods. All goods and services, whether tangible or intangible, are produced from scarce resources and can be subjected to economic analysis. If there are not enough goods and services for all of us, we will have to compete for those scarce goods and services. That is, scarcity ultimately leads to competition for the available goods and services, a subject we will return to often in the text.

Bads

In contrast to goods, **bads** are those items that we do not desire or want. For most people, garbage, pollution, weeds, and crime are bads. People tend to eliminate or minimize bads, so they will often pay to have bads, like garbage, removed. The elimination of the bad—garbage removal, for example—is a good.

labour

the physical and mental effort used by people in the production of goods and services

land

the natural resources used in the production of goods and services

capital

the equipment and structures used to produce goods and services

human capital

the productive knowledge and skill people receive from education and on-the-job training

entrepreneurship

the process of combining labour, land, and capital together to produce goods and services

goods

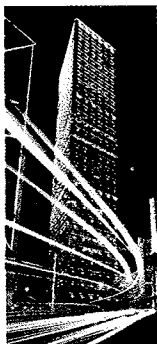
items we value or desire

service

an intangible act that people want

bads

items that we do not desire or want



BUSINESS CONNECTION

Business CONNECTION

ECONOMICS IN BUSINESS

Business students often wonder why they need to study economics. How will knowledge of economics help in making better business decisions? To appreciate the role of economics in business let's revisit the nature of business. A business is considered to be an organization that attempts to make a profit

by providing goods or services. Fundamentally, there is agreement that the goal of a business is to earn a profit. OK, but what is profit? Generally, profit is what remains after an organization subtracts its business costs or expenses from its sales revenues. One may therefore conclude that a good business is a business that generates a reasonable profit after all its business costs or expenses are subtracted from its sales revenues.

We may also see business as an equation, $P = R - C$, where R is the revenue from sales, C represents the related costs and expenses incurred to provide the goods or services, and P is the residual profit. Clearly, for a business to generate a profit, the revenues—that is, the funds collected from the sales of goods or services—must be greater than the total costs incurred to provide these same goods or services. Running a successful business is similar to solving a problem.

First, a look at revenues: The amount of revenue collected by an organization depends on the quantity of goods or services sold and the price for each good or service. If this is the case, how do businesses know what prices to charge and how many units to sell? Will consumers buy at these prices? And if so, how many units will they buy?

These two essential questions must be addressed if the organization is to make a profit (a positive number for P) and avoid a loss (a negative number for P). Good news: The critical information on the right price and the right quantities to solve the problem of making a profit is buried in economic theories, principles, and laws—so stay tuned in to economics. As you study this social science, you will begin to uncover answers to the two vital questions: What price? What quantity?

Now, a look at costs: To earn profit a business needs to manage the costs associated with revenues. These costs include many factors, such as salaries and wages for labour, Internet charges, and rent for buildings. The costs for these inputs will depend on their scarcity, since scarce resources will be relatively more expensive than abundant resources. Since the goal of a business is usually to make a profit, success in business is achieved by ensuring that total costs are less than total revenues. This is where an understanding of the economic principle of marginal costs versus marginal benefits will be useful in making business decisions regarding costs and revenues. Some costs will vary with the quantity of goods or services produced and sold. Others, such as rent, may remain fixed regardless of the number of units sold. Once again, knowledge of economics will help you to answer those all-important questions about how many units to produce and at what cost in order to maximize profit, the primary goal of a business.

One final thought: The concept of opportunity costs will also apply, as entrepreneurs check to see if they are in the right business.

Everyone Faces Scarcity

We all face scarcity because we cannot have all of the goods and services that we desire. However, because we all have different wants and desires, scarcity affects everyone differently. For example, a child in a developing country may face a scarcity of food and clean drinking water, whereas a rich person may face a scarcity of garage space for his growing antique car collection. Likewise, a harried middle-class working mother may find time for exercise particularly scarce, whereas a pharmaceutical company may be concerned with the scarcity of the natural resources it uses in its production process. Although its effects vary, no one can escape scarcity.

SECTION CHECK

- Scarcity exists when our wants exceed the available resources of land, labour, capital, and entrepreneurship.
- Goods and services are things that we value.

section

Opportunity Cost

- Why do we have to make choices?
- What do we give up when we have to choose?
- Why are “free” lunches not free?

WHY DO WE HAVE TO MAKE CHOICES?

We may want nice homes, two luxury cars in every garage, wholesome and good-tasting food, a personal trainer, and a therapist, all enjoyed in a pristine environment with zero pollution. If we had unlimited resources, and thus an ability to produce all of the goods and services anyone wanted, we would not have to choose among those desires. If we did not have to make meaningful economic choices, the study of economics would not be necessary. The essence of economics is to understand fully the implications that scarcity has for wise decision making. This suggests another way to define economics: *Economics is the study of the choices we make among our many wants and desires.*

WHAT DO WE GIVE UP WHEN WE HAVE TO CHOOSE?

We are all faced with scarcity and, as a consequence, we must make choices. Because none of us can “afford” to buy everything we want, each time we do decide to buy one good or service, we reduce our ability to buy other things we would also like to have. If you buy a new car this year, you may not be able to afford your next best choice—the vacation you’ve been planning. You must choose. The cost of the car to you is the value of the vacation that must be forgone. The highest or best forgone opportunity resulting from a decision is called the **opportunity cost**. For example, time spent running costs time that could have been spent doing something else that is valuable—perhaps spending time with friends or studying for an upcoming exam. Another way to put this is that “to choose is to lose” or “an opportunity cost is an opportunity lost.” To get more of anything that is desirable, you must accept less of something else that you also value.

One of the reasons why vehicle drivers talk so much on their cellphones is that they have little else to do with their time while driving—a low opportunity cost. However, drivers should not use cellphones while driving because this is a distraction; by not giving full attention to their driving, they are giving up safety. Trade-offs are everywhere.

Bill Gates, Tiger Woods, and Mark Zuckerberg all quit university or college to pursue their dreams. Tiger Woods dropped out of Stanford to join the PGA golf tour. Bill Gates dropped out of Harvard to start a software company. Mark Zuckerberg also dropped out of Harvard to continue working on his social networking site Facebook. Staying in school would have cost each of them millions of dollars. We cannot say it would have been the wrong decision to stay in school, but it would have been costly. For each of them, the opportunity cost of staying in school was high.

Money Prices and Costs

If you go to the store to buy groceries, you have to pay for the items you buy. This amount is called the *money price*. It is an opportunity cost, because you could have used the money to purchase other goods and services. However, additional opportunity costs include the nonprice costs incurred to acquire the groceries—time spent getting to the grocery store, finding a parking space, actually shopping, and waiting in the checkout line. The nonprice

opportunity cost
the highest or best forgone
opportunity resulting from a
decision

costs are measured by assessing the sacrifice involved—the value you place on what you would have done with the time if you had not gone shopping. So the cost of grocery shopping is the price paid for the goods plus the nonprice costs incurred.

Remember that many costs do not involve money but are still costs. Do I major in accounting or human resources? Do I go to college or university? Should I get an M.B.A. now or work and wait a few years to go back to school?

Policymakers are unavoidably faced with opportunity costs too. Consider airline safety. Both money costs and time costs affect airline safety. New airline safety devices cost money (luggage inspection devices, fuel tank safeguards, new radar equipment, and so on), and time costs are quite relevant with the new safety checks. Time waiting in line costs time that could be spent doing something that is valuable. New airline safety requirements could also actually cost lives. If the new safety equipment costs are passed on in the form of higher airline ticket prices, people may choose to travel by car, which is far more dangerous per kilometre than air travel is. Opportunity costs are everywhere!

The Opportunity Cost of Going to College or Having a Child

The average person often does not correctly consider opportunity costs when thinking about costs. For example, the opportunity cost of going to college is not just the direct expense of tuition and books; of course, those expenses do involve an opportunity cost, because the money used for books and tuition could be used for other things that you value. But what about the nonmoney costs? That is, going to college also includes the opportunity cost of your time. Specifically, the time spent going to school is time that could have been spent on a job earning, say, \$30 000 a year. And how often do people consider the opportunity cost of raising a child to the age of 18? There are the direct costs: food, visits to the dentist, clothes, piano lessons, and so on. But there are also additional costs incurred in rearing a child. Consider the cost if one parent chooses to give up his or her job to stay at home: Then, the time spent in child-rearing is time that could have been used making money and pursuing a career.

WHY ARE "FREE" LUNCHES NOT FREE?

The expression *there's no such thing as a free lunch* clarifies the relationship between scarcity and opportunity cost. Suppose the school cafeteria is offering "free" lunches today. Although the lunch is free to you, is it really free from society's perspective? The answer is no, because some of society's scarce resources will have been used in the preparation of the lunch. The issue is whether the resources that went into creating that lunch could have been used to produce something else of value. Clearly, the scarce resources that went into the production of the lunch like the labour and materials (food-service workers, lettuce, meat, plows, tractors, fertilizer, and so forth) could have been used in other ways. They had an opportunity cost, and thus were not free. Whenever you hear the word "free"—free libraries, free admission, and so on—an alarm should go off in your head. Very few things are free in the sense that they use none of society's scarce resources. So what does a free lunch really mean? It is, technically speaking, a "subsidized" lunch—a lunch using society's scarce resources, but one for which you personally do not have to pay.

SECTION CHECK

- Scarcity means we all have to make choices.
- When we are forced to choose, we give up the next highest-valued alternative.
- Because the production of any good uses up some of society's resources, there is no such thing as a free lunch.

section

1.5

Marginal Thinking

- What do we mean by marginal thinking?
- What is the rule of rational choice?

marginal thinking
focusing on the additional, or
incremental, choices

WHAT DO WE MEAN BY MARGINAL THINKING?

Most choices involve how *much* of something to do, rather than whether or not to do something. It is not *whether* you eat, but *how much* you eat. Hopefully, the question is not *whether* to study this semester but instead *how much* to study this semester. For example, “If I studied a little more, I might be able to improve my grade,” or “If I had a little better concentration when I was studying, I could improve my grade.” This is what economists call **marginal thinking** because the focus is on the additional, or incremental, choices. Marginal choices involve the effects of adding to or subtracting from the current situation. In short, it is the small (or large) incremental changes to a plan of action.

Always watch out for the difference between average and marginal costs. Suppose the cost to an airline of flying 250 passengers from Edmonton to Montreal was \$100 000. The average cost per seat would be \$400 (the total cost divided by the number of seats—\$100 000/250). If ten people are on standby and willing to pay \$300 for a seat on the flight, should the airline sell them a ticket? Yes! The unoccupied seats earn nothing for the airline. The airline pays the \$400 average cost per seat regardless of whether or not someone is sitting in the seat. What the airline needs to focus on are the additional (marginal) costs of a few extra passengers. The marginal costs are minimal—slight wear and tear on the airplane, handling some extra baggage, and ten extra in-flight meals. In this case, thinking at the margin can increase total profits, even if it means selling at less than-average cost of production.

Another good example of marginal thinking is auctions. Prices are bid up marginally as the auctioneer calls out one price after another. When a bidder views the new price (the marginal cost) to be greater than the value she places on the good (the marginal benefit), she withdraws from further bidding.

WHAT IS THE RULE OF RATIONAL CHOICE?

rule of rational choice
individuals will pursue an
activity if the expected marginal
benefits are greater than the
expected marginal costs

In trying to make themselves better off, individuals will pursue an activity if the expected marginal benefits are greater than the expected marginal costs—this is the **rule of rational choice**. The term *expected* is used with marginal benefits and costs because the world is uncertain in many important respects, so the actual result of changing behaviour may not always make people better off—but on average it will. However, as a matter of rationality, people are assumed to engage only in behaviour that they think ahead of time will make them better off. That is, individuals will pursue an activity only if the expected marginal benefits are greater than the expected marginal costs, or $E(MB) > E(MC)$. This fairly unrestrictive and realistic view of individuals seeking self-betterment can be used to analyze a variety of social phenomena.

Suppose that you have to get up for an 8 A.M. class but have been up very late. When the alarm goes off at 7 A.M., you are weighing the marginal benefits and marginal costs of

an extra 15 minutes of sleep. If you perceive the marginal benefits of 15 minutes of sleep to be greater than the marginal costs of those extra minutes, you may choose to hit the snooze button. Or perhaps you may decide to blow off class completely. But it's unlikely you will choose that action if it is the day of the final exam, because it is now likely that the **net benefits**—the difference between the expected marginal benefits and expected marginal costs—of skipping class have changed. When people have opportunities to better themselves, they usually take them. And they will continue to seek those opportunities as long as they expect a net benefit from doing so.

The rule of rational choice is simply the rule of being sensible, and most economists believe that individuals act *as if* they are sensible and apply the rule of rational choice to their daily lives. It is a rule that can help us understand our decision to study, walk, shop, exercise, clean house, cook, and perform just about every other action. It is also a rule that we will continue to use throughout the text because whether we are consumers, producers, or policymakers, we all must compare the expected marginal benefits and the expected marginal costs to determine the best level to consume, produce, or develop policies.

net benefits

The difference between the expected marginal benefits and expected marginal costs

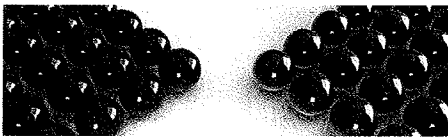


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Zero Pollution Would Be Too Costly

Let's use the concept of marginal thinking to evaluate pollution levels. We all know the benefits of a cleaner environment, but what would we have to give up—that is, what marginal costs would we have to incur—in order to achieve zero pollution? A lot! You could not drive a car, fly in a plane, or even ride a bike, especially if everybody else was riding bikes too (because congestion is a form of pollution). How would you get to school or work, or go to the movies or the grocery store? Everyone would

What would you be willing to give up to eliminate the rush-hour congestion you face? Think of the number of hours drivers waste each year sitting in traffic in Canada's largest cities. It costs the Canadian economy hundreds of millions of dollars a year in lost wages and wasted fuel.



DEBATE

SHOULD WE VIEW ECONOMICS AS A RATIONAL SCIENCE?

Economics as a social science sometimes tries to explain economic principles and outcomes as predictable laws, and for the most part, it is successful. One of the keys to explaining economic principles is that people respond in predictable, rational, and self-interested ways. As this forms the foundation for many of our basic economic principles, we should be able to predict future outcomes based on past experiences—similar in nature to scientific methods and experimentation in the natural sciences. This leads us to our debate for this chapter: "Should we view economics as a rational science?"

Pro:

It is necessary to view economics as a rational science as this view forms the foundation for the basic principles of economic theory. Most economists believe that it is rational for people to anticipate the likely future consequences of their own behaviour; some would infer from this that a rational person would usually make decisions that are in their own self-interest. Such a theory provides a good base for the study of economics, and is useful when trying to forecast or explain future decisions.

Con:

While having a basic understanding of economics is useful, it becomes almost irrelevant because people don't always make rational decisions. For example, why would someone pay \$10 for a "Pet Rock" when they can have their own pet rock simply by picking up a rock from the ground? Why do people buy company shares when the price is high? A rational person would not get caught up in hype. Because people make so many irrational decisions, isn't the foundation of economics unstable simply because of the irrational behaviour?

have to grow their own food because transporting, storing, and producing food uses machinery and equipment that pollutes. And even growing your own food would be a problem because many plants emit natural pollutants. We could go on and on. The point is *not* that we shouldn't be concerned about the environment; rather, we have to weigh the expected marginal benefits of a cleaner environment against the expected marginal costs of a cleaner environment. This is not to say the environment should not be cleaner, only that zero pollution levels would be far too costly in terms of what we would have to give up.

Optimal (Best) Levels of Safety

Just as we can have optimal (or best) levels of pollution that are greater than zero, it is also true for crime and safety. Take crime. What would it cost society to have zero crime? It would be prohibitively costly to divert a tremendous amount of our valuable resources toward the total elimination of crime. In fact, it would be impossible to eliminate crime totally. But it would also be costly to reduce crime significantly. Since lower crime rates are costly, society must decide how much it is willing to give up: The additional resources for crime prevention can come only from limited resources, which could be used to produce something else possibly valued even more.

The same is true for safer products. Nobody wants defective tires on their cars, or cars that are unsafe and roll over at low speeds. However, there are optimal amounts of safety that are greater than zero too. The issue is not safe versus unsafe products but rather *how much* safety consumers want. It is not risk versus no risk but rather *how much* risk are we willing to take? Additional safety can come only at higher costs. To make all products perfectly safe would be impossible, so we must weigh the benefits and costs of safer products. In fact, according to one U.S. study by Sam Peltzman, a University of Chicago economist, additional safety features in cars (mandatory safety belts, padded dashboards) in the late 1960s may have had little impact on highway fatalities. Peltzman found that making cars safer led to more reckless driving and more accidents. Although the safety regulations did result in fewer deaths per automobile accident, the total number of deaths remained unchanged because there were more accidents.

Reckless driving has benefits—getting somewhere more quickly—but it also has costs—possibly causing an accident or even a fatality. Rational people will compare the marginal benefits and marginal costs of safer driving and make the choices that they believe will get them to their destination safely. We would expect that even thrill-seekers would slow down if there were higher fines and/or increased law enforcement. It would change the benefit–cost equation for reckless driving (as would bad brakes, bald tires, and poor visibility). On the other hand, compulsory seat belts and air bags might cause motorists to drive more recklessly.

SECTION CHECK

- Economists are usually interested in the effects of additional, or marginal, changes in a given situation.
- The rule of rational choice states that individuals will pursue an activity if they expect the marginal benefits to be greater than the marginal costs, or $E(MB) > E(MC)$.
- People make decisions based on what they expect to happen.
- The optimal (best) levels of pollution, crime, and safety are greater than zero.

section

Incentives Matter

- Can we predict how people will respond to changes in incentives?
- What are positive and negative incentives?

CAN WE PREDICT HOW PEOPLE WILL RESPOND TO CHANGES IN INCENTIVES?

In acting rationally, people are responding to incentives. That is, they are reacting to the changes in expected marginal benefits and expected marginal costs. In fact, much of human behaviour can be explained and predicted as a response to incentives. Consider the economic view of crime. Why do criminals engage in their “occupation”? Presumably because the “job,” even with its risks, is preferred to alternative forms of employment. For criminals, the benefits of their actions are higher and/or the opportunity costs of them are lower than is the case for noncriminals. In some cases, criminals cannot get a legitimate job at a wage they would find acceptable, so the cost of crime in terms of other income foregone may be quite low. At other times, the likelihood of being caught is small, so the expected cost is negligible. Also, for some, the moral cost of a crime is low, whereas for others it is high. The benefits, in terms of wealth gained, are clear. If the expected gains or benefits from committing a crime outweigh the expected costs, the activity is pursued. For most policy purposes, the primary concern is not what causes the level of crime to be what it is but, rather, what causes the level of crime to change. Changes in the crime rate can be largely explained in terms of such a benefit–cost framework. If the benefits of crime rise, say, in the form of larger real “hauls,” and/or if the costs fall due to a reduced likelihood of being caught or of being imprisoned if caught, then economists would expect the amount of crime to rise. Likewise, economists would expect the crime rate to fall in response to increased police enforcement, stiffer punishments, or an increase in the employment rate. Whether this analysis tells the complete story is debatable, but the use of the economic framework in thinking about the problem provides valuable insight.

WHAT ARE POSITIVE AND NEGATIVE INCENTIVES?

Almost all of economics can be reduced to incentive [$E(MB)$ versus $E(MC)$] stories, where consumers and producers are driven by incentives that affect expected costs or benefits. Prices, wages, profits, taxes, and subsidies are all examples of economic incentives. Incentives can be classified into two types: positive and negative. **Positive incentives** are those that either increase benefits or reduce costs and thus result in an increased level of the related activity or behaviour. **Negative incentives**, on the other hand, either reduce benefits or increase costs, resulting in a decreased level of the related activity or behaviour. For example, a tax on cars that emit lots of pollution (an increase in costs) would be a negative incentive that would lead to a reduction in emitted pollution. On the other hand, a subsidy (the opposite of a tax) for hybrid cars—part electric, part internal combustion—would be a positive incentive that would encourage greater production and consumption of hybrid cars. Human behaviour is influenced in predictable ways by such changes in economic incentives, and economists use this information to predict what will happen when the benefits and costs of any choice are changed. In short, economists study the incentives and consequences of particular actions.

positive incentives
incentives that either reduce costs or increase benefits resulting in an increase in the activity or behaviour

negative incentives
incentives that either increase costs or reduce benefits resulting in a decrease in the activity or behaviour

A subsidy for hybrid electric vehicles (HEVs) would be a positive incentive that would encourage greater production and consumption of these vehicles. Honda's Insight is expected to go 1100 kilometres on a single tank of gas; the Toyota Prius is expected to go about 700 kilometres.



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SECTION CHECK

- People respond to incentives in predictable ways.
- A positive incentive decreases costs or increases benefits, thus encouraging consumption or production, while a negative incentive increases costs or reduces benefits, thus discouraging consumption or production.

section

1.7

Specialization and Trade

- Why do people specialize?
- How do specialization and trade lead to greater wealth and prosperity?

WHY DO PEOPLE SPECIALIZE?

As you look around, you can see that people specialize in what they produce. They tend to dedicate their resources to one primary activity, whether it be child-rearing, driving a bus, or making bagels. Why is this? The answer, short and simple, is opportunity costs. By concentrating on the production of one, or a few, goods, individuals are **specializing**. This allows them to make the best use of (and thus gain the most benefit from) their limited resources. A person, a region, or a country can gain by specializing in the production of the good in which they have a comparative advantage. That is, if they can produce a good or service at a lower opportunity cost than others, we say that they have a **comparative advantage** in the production of that good or service.

For example, should a lawyer who types 100 words per minute hire an administrative assistant to type her legal documents if the assistant can type only 50 words per minute? The answer to this question depends on the particular comparative advantages of the lawyer and the administrative assistant. Consider a job that would take the lawyer five hours and the administrative assistant ten hours to complete. If the lawyer makes \$100 an hour, and the administrative assistant earns \$10 an hour, who has the comparative advantage?

specializing

concentrating on the production of one, or a few, goods

comparative advantage

occurs when a person or a country can produce a good or service at a lower opportunity cost than others can

If the lawyer types her own documents, it will cost \$500 ($\100 per hour \times 5 hours). If she has the administrative assistant type her documents, it will cost \$100 ($\10 per hour \times 10 hours). Clearly, then, the lawyer should hire the administrative assistant to type her documents because the administrative assistant has the comparative advantage (lower opportunity cost) in this case, despite being half as good in absolute terms.

We All Specialize

We all specialize to some extent and rely on others to produce most of the goods and services we want. The work that we choose to do reflects our specialization. For example, we may specialize in selling or fixing automobiles. The wages from that work can then be used to buy goods from a farmer who has chosen to specialize in the production of food. Likewise, the farmer can use the money earned from selling his produce to get his tractor fixed by someone who specializes in that activity.

Specialization is evident not only among individuals but among regions and countries as well. In fact, the story of the economic development of Canada involves specialization. Within Canada, the prairies with their wheat, the Maritime provinces of eastern Canada with their fishing fleets, and British Columbia with its lumber are all examples of regional specialization.

The Advantages of Specialization

In a small business, employees may perform a wide variety of tasks—from hiring to word processing to marketing. As the size of the company increases, each employee can perform a more specialized job, with a consequent increase in output per worker. The primary advantages of specialization are that employees acquire greater skill from repetition, they avoid wasted time in shifting from one task to another, and they do the types of work for which they are best suited. Specialization also promotes the use of specialized equipment for specialized tasks.

The advantages of specialization are seen throughout the workplace. For example, in larger firms, specialists conduct personnel relations and accounting is in the hands of full-time accountants; such jobs are too critical in large firms to be done by someone with half a dozen other tasks to perform. The owner of a small retail store selects the location for the store primarily through guesswork, placing it where she believes sales will be high or where an empty, low-rent building is available. In contrast, larger chains have store sites selected by experts who have experience in analyzing the factors that make different locations relatively more desirable, like traffic patterns, income levels, demographics, and so on.

HOW DO SPECIALIZATION AND TRADE LEAD TO GREATER WEALTH AND PROSPERITY?

Trade, or voluntary exchange, directly increases wealth by making both parties better off (or they wouldn't trade). It is the prospect of wealth-increasing exchange that leads to productive specialization. That is, trade increases wealth by allowing a person, a region, or a nation to specialize in those products that it produces at a lower opportunity cost and to trade for those products that others produce at a lower opportunity cost. That is, we trade with others because it frees up time and resources to do other things that we do better. For example, say Canada is better at producing wheat than Brazil, and Brazil is better at producing coffee than Canada. Canada and Brazil would each benefit if Canada produces wheat and trades some of it to Brazil for coffee. Coffee growers in Canada could grow coffee in expensive greenhouses, but it would result in higher coffee costs and prices, while leaving fewer resources available for employment in more productive jobs, such as wheat production. This is true for individuals, too.

Imagine Tom had 10 kilograms of tea and Katherine had 10 kilograms of coffee. However, Tom preferred coffee to tea and Katherine preferred tea to coffee. So if Tom traded his tea to Katherine for her coffee, both parties would be better off. Trade simply reallocates existing goods, and voluntary exchange increases wealth by making both parties better off, or they would not agree to trade.

In short, if we divide the tasks and produce what we do *relatively* best and trade for the rest, we will be better off than if we were self-sufficient—that is, without trade. Imagine life without trade, where you were completely self-sufficient—growing your own food, making your own clothes, working on your own car, building your own house. Do you think you would be better off?

SECTION CHECK

- Specialization is important for individuals, businesses, regions, and nations. It allows them to make the best use of their limited resources.
- Specialization and trade increase wealth by allowing a person, a region, or a nation to specialize in those products that it produces at a lower opportunity cost and to trade for those products that others produce at a lower opportunity cost.

section

1.8

Market Prices Coordinate Economic Activity

- How does a market system allocate scarce resources?
- What are the effects of price controls?
- What is a market failure?

HOW DOES A MARKET SYSTEM ALLOCATE SCARCE RESOURCES?

In a world of scarcity, competition is inescapable, and one method of allocating resources among competing uses is the market system. The market system provides a way for millions of producers and consumers to allocate scarce resources. For the most part, markets are efficient. To an economist, **efficiency** is achieved when the economy gets the most out of its scarce resources. In short, efficiency makes the economic pie as large as possible.

Buyers and sellers indicate their wants through their actions and inaction in the marketplace, and it is this collective “voice” that determines how resources are allocated. But how is this information communicated? Market prices serve as the language of the market system. By understanding what these market prices mean, you can get a better understanding of the vital function that the market system performs.

Markets may not always conform to your desired tastes and preferences. You may think that markets produce too many Chia Pets, fast foods, face-lifts, and Justin Bieber CDs. Some markets are illegal—the market for cocaine, the market for stolen body parts, and the market for child pornography. Markets do not come with a moral compass; they simply provide what buyers are willing and able to pay for and what sellers are willing and able to produce.

efficiency
getting the most from society's
scarce resources

Market Prices Provide Important Information

Market prices communicate important information to both buyers and sellers. These prices communicate information about the relative availability of products to buyers, and they provide sellers with critical information about the relative value that consumers place on those products. In effect, market prices provide a way for both buyers and sellers to communicate about the relative value of resources. This communication results in a shifting of resources from those uses that are less valued to those that are more valued. We will see how this works beginning in Chapter 3.

The basis of a market economy is the voluntary exchange and the price system that guide people's choices and produce solutions to the questions of what goods to produce and how to produce and distribute them.

Take something as simple as the production of a pencil. Where did the wood come from? Perhaps British Columbia or Quebec. The graphite may have come from the mines in northern Ontario, and the rubber maybe from Malaysia. The paint, the glue, the metal piece that holds the eraser—who knows? The point is that market forces coordinated this activity among literally thousands of people, some of whom live in different countries and speak different languages. The market system brought these people together to make a pencil that sells for 25 cents at your bookstore. It all happened because the market system provided the incentive for people to pursue activities that benefit others. This same process produces millions of goods and services around the world from automobiles and computers to pencils and paper clips. The same is true of the iPod and iPhone. The entrepreneurs at Apple have learned how to combine almost 500 generic parts to make something of much greater value. The whole is greater than the sum of the parts.

In countries that do not rely on the market system, there is no clear communication between buyers and sellers. In the former Soviet Union, where quality was virtually nonexistent, there were shortages of quality goods and surpluses of low-quality goods. For example, there were thousands of tractors without spare parts and millions of pairs of shoes that were left on shelves because the sizes did not match those of the population.

WHAT ARE THE EFFECTS OF PRICE CONTROLS?

Government policies called **price controls** are government-mandated minimum or maximum prices that sometimes force prices above or below what they would be in a market economy. Unfortunately, these controls often harm the same people they are trying to help, in large part by short-circuiting the market's information transmission function. That is, price controls effectively strip the market price of its meaning for both buyers and sellers (which we will see in Chapters 3 and 4). A sales tax will also distort price signals, leading to a misallocation of resources (which we will see in Chapter 5).

price controls
government-mandated
minimum or maximum prices

WHAT IS A MARKET FAILURE?

The market mechanism is a simple but effective and efficient general means of allocating resources among alternative uses. When the economy fails to allocate resources efficiently on its own, however, it is known as **market failure**. For example, a steel mill might put soot and other forms of "crud" into the air as a by-product of making steel. When it does this, it imposes costs on others not connected with using or producing steel from the steel mill. The soot may require homeowners to paint their homes more often, entailing a cost. And studies show that respiratory diseases are greater in areas with more severe air pollution, imposing costs and often shortening life itself. In addition, the steel mill might discharge chemicals into a stream, thus killing wildlife and spoiling

market failure
when the economy fails to
allocate resources efficiently
on its own

recreational activities for the local population. In this case, the steel factory emits too much pollution but does not bear the cost of its polluting actions. In other words, by transferring the pollution costs onto society, the firm has lowered its costs of production and is now producing more than the ideal output—this is inefficient because it is an overallocation of resources.

Markets can also produce too little of a good—research, for example. The government might decide to subsidize promising scientific research that may benefit many people—like cancer research.

Whether the market economy has produced too little (underallocation) or too much (overallocation), the government can improve society's well-being by intervening. The case of market failure will be taken up in more detail in Chapter 6.

In addition, we cannot depend on the market economy to always communicate accurately. Some firms may have market power to distort prices in their favour. For example, the only regional cement company in the area has the ability to charge a higher price and provide a lower-quality product than if the company was in a highly competitive market. In this case, the lack of competition can lead to higher prices and reduced product quality. And without adequate information, unscrupulous producers may be able to misrepresent their products to the disadvantage of unwary consumers.

The Market Distribution of Income

Sometimes a painful trade-off exists between how much an economy can produce efficiently and how that output is distributed—the degree of equality. There is no guarantee that the market economy will provide everyone with adequate amounts of food, shelter, and transportation. That is, not only does the market determine what goods are going to be produced, and in what quantities, but it also determines the distribution of output among members of society.

As with other aspects of government intervention, the degree-of-equity argument can generate some sharp disagreements. What is “fair” for one person may seem highly “unfair” to someone else. Although one person may find it terribly unfair for some individuals to earn many times the amount that other individuals who work equally hard earn, another person may find it highly unfair to ask one group, the relatively rich, to pay a much higher proportion of their income in taxes than another group.

SECTION CHECK

- Through voluntary exchange and the price system, the market system provides a way for producers and consumers to allocate scarce resources.
- Price controls sometimes force prices above or below what they would be in a market economy.
- A market failure occurs when an economy fails to allocate resources efficiently on its own.

A complete glossary of key terms and their definitions is available in CourseMate.

For Your Review

Section 1.1

1. Write your own definition of *economics*. What are the main elements of the definition?
2. Would the following topics be covered in microeconomics or macroeconomics?
 - a. the effects of an increase in the supply of lumber on the home-building industry
 - b. changes in the national unemployment rate
 - c. the effect of interest rates on the machine-tool industry
 - d. the effect of interest rates on the demand for investment goods
 - e. the way a firm maximizes profits

Section 1.2

3. Are the following statements normative or positive, or do they contain both normative and positive statements?
 - a. A higher income tax rate would generate increased tax revenues. Those extra revenues should be used to give more government aid to the poor.
 - b. The study of physics is more valuable than the study of sociology, but both should be studied by all college students.
 - c. An increase in the price of wheat will decrease the amount of wheat purchased. However, it will increase the amount of wheat supplied to the market.
 - d. A decrease in the price of butter will increase the amount of butter purchased, but that would be bad because it would increase Canadians' cholesterol levels.
 - e. The birth rate is reduced as economies urbanize, but that also leads to an increased average age of developing countries' populations.
4. Which of the following economic statements are positive and which are normative?
 - a. A tax increase will increase unemployment.
 - b. The government should reduce funding for social assistance programs.
 - c. Tariffs on imported wine will lead to higher prices for domestic wine.
 - d. A decrease in the capital gains tax rate will increase investment.
 - e. Goods purchased on the Internet should be subject to provincial sales taxes.
 - f. A reduction in interest rates will cause inflation.
5. The following statement represents which fallacy in thinking? Explain why.
"I earn \$12 per hour. If I am able to earn \$12 per hour, everyone should be able to find work for at least that wage rate."

6. Do any of the following statements involve fallacies? If so, which ones do they involve?
- Because sitting in the back of classrooms is correlated with getting lower grades in the class, students should always sit closer to the front of the classroom.
 - Historically, the stock market rises in years the NFC team wins the Super Bowl and falls when the AFC wins the Super Bowl. I am rooting for the NFC team to win for the sake of my investment portfolio.
 - When a hockey team spends more to get better players, it is more successful, which proves that all the teams should spend more to get better players.
 - Gasoline prices were higher last year than in 1970, yet people purchased more gas, which contradicts the law of demand.
 - An increase in the amount of money I have will make me better off, but an increase in the supply of money in the economy will not make Canadians as a group better off.

Section 1.3

7. Explain the difference between poverty and scarcity.
8. The automotive revolution after World War II reduced the time involved for travel and shipping goods. This innovation allowed the Canadian economy to produce more goods and services since it freed resources involved in transportation for other uses. The transportation revolution also increased wants. Identify two ways in which vehicle manufacturers evoked new wants.
9. Which of the following goods are scarce?
- garbage
 - salt water in the ocean
 - clothes
 - clean air in a big city
 - dirty air in a big city
 - public libraries

Section 1.4

10. The price of a one-way bus trip from Toronto to Ottawa is \$150. Sarah, a school-teacher, pays the same price in February (during the school year) as in July (during her vacation), so the cost is the same in February as in July. Do you agree?
11. Pizza Pizza once ran a promotion that whenever the Ottawa Senators scored six goals or more, Pizza Pizza gave everyone with a ticket to that day's game a free slice of pizza. If holders of ticket stubs have to stand in line for ten minutes, is the slice of pizza really "free"?
12. List the opportunity costs of the following:
- going to college or university
 - missing a lecture
 - withdrawing and spending \$100 from your savings account, which earns 5 percent interest annually
 - going snowboarding on the weekend before final examinations

Section 1.5

13. Assume the total benefits to Mark from trips to a local amusement park during the year are given by the following schedule: 1 trip, \$60; 2 trips, \$115; 3 trips, \$165; 4 trips, \$200; 5 trips, \$225; 6 or more trips, \$240.
- What is Mark's marginal benefit of the third trip? The fifth trip?
 - If the admission price to the amusement park was \$45 per day, how many times would Mark be willing and able to go in a year? What if the price was \$20 per day? Explain.
 - If the amusement park offered a year-long pass for \$200 rather than a per day admission price, would Mark be willing to buy one? If so, how many times would he go? Explain.
14. Assume the total cost of producing widgets was \$4200 for 42 units; \$4257 for 43 units; \$4332 for 44 units; and \$4420 for 45 units.
- What is the marginal cost of producing the 43rd unit? The 45th unit?
 - If the widget producer could sell at \$60 per unit however many he could produce, how many would he choose to produce? If he could sell at \$80 per unit however many he could produce? Explain.
15. Imagine that you are trying to decide whether to cross a street without using the designated crosswalk at the traffic signal. What are the expected marginal benefits of crossing? What are the expected marginal costs? How would the following conditions change your benefit–cost equation?
- The street was busy.
 - The street was empty and it was 3:00 A.M.
 - You were in a huge hurry.
 - There was a police officer 10 metres away.
 - The closest crosswalk was 1 kilometre away.
 - The closest crosswalk was 5 metres away.

Section 1.6

16. Which of the following are positive incentives? Negative incentives? Why?
- a fine for not cleaning up after your dog defecates in the park
 - a trip to Hawaii paid for by your parents or significant other for earning an A in your economics course
 - a higher tax on cigarettes and alcohol
 - a subsidy for installing solar panels on your house
17. The penalty for drug trafficking in Singapore is death. Do you think there would be more drug traffickers in Singapore if the mandatory sentence was five years, with parole for good behaviour?

Section 1.7

18. Throughout history, many countries have chosen the path of autarky, choosing to not trade with other countries. Explain why this path would make a country poorer.
19. Farmer Fran can grow soybeans and corn. She can grow 1500 kilograms of soybeans or 3000 kilograms of corn on a hectare of her land for the same cost. The price of soybeans is \$1.50 per kilogram and the price of corn is \$0.60 per kilogram. Show the benefits to Fran of specialization. What should she specialize in?

20. Which region has a comparative advantage in the following goods?
- wheat: Colombia or Canada
 - coffee: Colombia or Canada
 - lumber: Alberta or British Columbia
 - oil: Alberta or British Columbia
21. a. Why is it important that the country or region with the lower opportunity cost produce the good?
- b. How would you use the concept of comparative advantage to argue for reducing restrictions on trade between countries?

Section 1.8

22. Prices communicate information about the relative value of resources. Which of the following would cause the relative value and, hence, the price, of potatoes to rise?
- A fungus infestation wipes out half of the Prince Edward Island potato crop.
 - The price of potato chips rises.
 - Scientists find that eating potato chips makes you better-looking.
 - The prices of wheat, rice, and other potato substitutes fall dramatically.
23. People communicate with each other in the market through the effect their decisions to buy or sell have on prices. Indicate how each of the following would affect prices by putting a check in the appropriate space.
- People who see an energetic and lovable Jack Russell terrier in a popular TV series want Jack Russell terriers as pets. The price of Jack Russell terriers ___ Rises ___ Falls.
 - Retirees flock to Tampa, Florida, to live. The price of housing in Tampa ___ Rises ___ Falls.
 - Weather-related crop failures in Colombia and Costa Rica reduce coffee supplies. The price of coffee ___ Rises ___ Falls.
 - Wheat fields in Alberta are replaced with oil rigs. The price of wheat ___ Rises ___ Falls.
 - More and more students graduate from Canadian medical schools. The wages of Canadian doctors ___ Rise ___ Fall.
 - Canadians are driving more and they are driving bigger, gas-guzzling cars like sport utility vehicles. The price of gasoline _____ Rises _____ Falls.

Appendix

Working with Graphs

GRAPHS ARE AN IMPORTANT ECONOMIC TOOL

Sometimes the use of visual aids, such as graphs, greatly enhances our understanding of a theory. It is much the same as finding your way to a friend's house with the aid of a map rather than with detailed verbal or written instructions. Graphs are important tools for economists. They allow us to understand better the workings of the economy. To economists, a graph can be worth a thousand words. This text will use graphs throughout to enhance the understanding of important economic relationships. This appendix provides a guide on how to read and create your own graphs.

The most useful graph for our purposes is one that merely connects a vertical line (the **Y-axis**) with a horizontal line (the **X-axis**), as seen in Exhibit 1. The intersection of the two lines occurs at the origin, which is where the value of both variables is equal to zero. In Exhibit 1, the graph has four quadrants or "boxes." In this textbook we will be primarily concerned with the shaded box in the upper right-hand corner. This portion of the graph deals exclusively with positive numbers. Always keep in mind that moving to the right on the horizontal axis and up along the vertical axis each lead to higher values.

Y-axis

the vertical axis on a graph

X-axis

the horizontal axis on a graph

pie chart

a circle subdivided into proportionate slices that represent various quantities that add up to 100 percent

bar graph

represents data using vertical bars rising from the horizontal axis

time-series graph

shows changes in the value of a variable over time

USING GRAPHS AND CHARTS

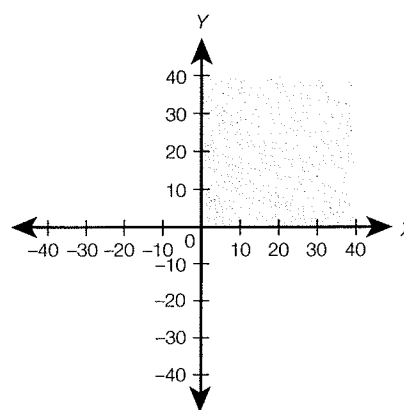
Exhibit 2 presents three common types of graphs. A **pie chart** is a circle subdivided into proportionate slices that represent various quantities that add up to 100 percent. The pie chart in Exhibit 2(a) shows what college students earn. That is, each slice in the pie chart represents the percentage of college students in a particular earnings category.

A **bar graph** represents data using vertical bars rising from the horizontal axis. Exhibit 2(b) is a bar graph that shows the sales of wireless phone service by province for a new company that has just entered the Canadian market. The height of the line represents sales in millions of dollars. Bar graphs are used to show a comparison of the sizes of quantities of similar items.

Exhibit 2(c) is a **time-series graph**. This type of graph shows changes in the value of a variable over time. This is a visual tool that allows us to observe important trends over a certain time period. In Exhibit 2(c) we see a graph that shows trends in the stock price of Fly-by-Chance Airlines for the period January to December. The horizontal axis shows us the passage of time, and the vertical axis shows us the stock price in dollars per share.

appendix

Plotting a Graph



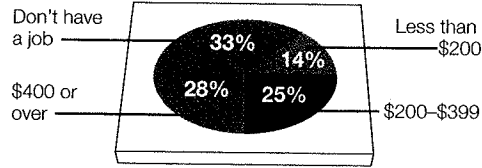
In the upper right-hand corner, we see that the graph includes a positive figure for the Y-axis and the X-axis. As we move to the right along the horizontal axis, the numerical values increase. As we move up along the vertical axis, the numerical values increase.

appendix Pie Chart, Bar Graph, and Time-Series Graph

(a) Pie Chart

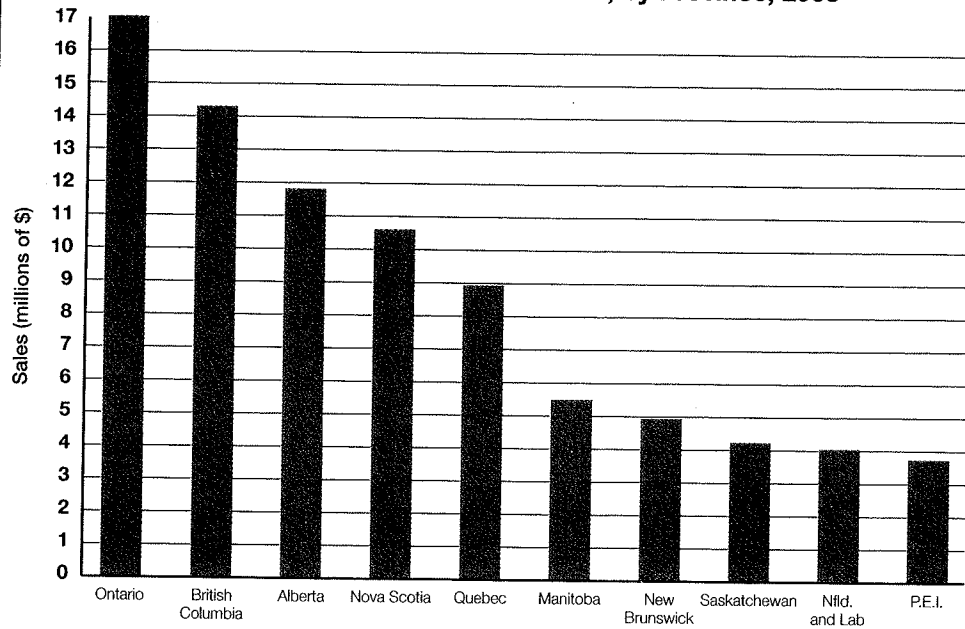
What college students earn

Monthly income from jobs



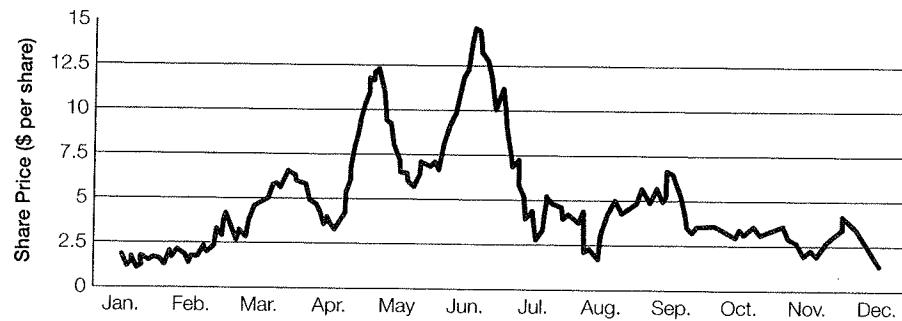
(b) Bar Graph

Sales of Wireless Phone Service, by Province, 2008



(c) Time-Series Graph

Fly-by-Chance Stock Price



USING GRAPHS TO SHOW THE RELATIONSHIP BETWEEN TWO VARIABLES

variable

something that is measured by a number, such as your height

Although the graphs and chart in Exhibit 2 are important, they do not allow us to show the relationship between two variables (a **variable** is something that is measured by a

number, such as your height). To more closely examine the structure and functions of graphs, let us consider the story of Katherine, an avid in-line skater who has aspirations of winning the Z Games next year. To get there, however, she will have to put in many hours of practice. But how many hours? In search of information about the practice habits of other skaters, she logged onto the Internet, where she pulled up the results of a study conducted by ESPM 3 that indicated the score of each Z Games competitor and the amount of practice time per week spent by each skater. The results of this study (see Exhibit 3) indicated that skaters had to practise 10 hours per week to receive a score of 4.0, 20 hours per week to receive a score of 6.0, 30 hours per week to get a score of 8.0, and 40 hours per week to get a perfect score of 10. What does this information tell Katherine? By using a graph, she can more clearly understand the relationship between practice time and overall score.

A Positive Relationship

The study on scores and practice times revealed what is called a direct relationship, also called a positive relationship. A **positive relationship** means that the variables change in the same direction. That is, an increase in one variable (practice time) is accompanied by an increase in the other variable (overall score), or a decrease in one variable (practice time) is accompanied by a decrease in the other variable (overall score). In short, the variables change in the same direction.

A Negative Relationship

When two variables change in opposite directions, we say they are inversely related, or have a **negative relationship**. That is, when one variable rises, the other variable falls, or when one variable decreases, the other variable increases.

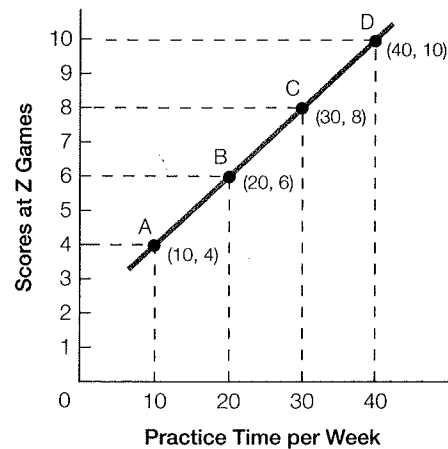
Variables That Have a Maximum or a Minimum

Many relationships described in economic models have maximum or minimum values. For example, firms are always looking to make the maximum possible profits; one way they can achieve this is by minimizing their costs. Exhibits 4 and 5 show relationships that have maximum and minimum values.

Exhibit 4 shows the first case—a relationship that begins positive, reaches a maximum, and then ends with a negative relationship. This example of the relationship between tax rates and tax revenue shows what economists refer to as the *Laffer curve*. When the tax rate is zero, the government receives no tax revenue. As the tax rate rises, tax revenue increases because the government receives a larger percentage of people's incomes. In the exhibit, a tax rate of 50 percent generates the maximum tax revenue of \$15 million. As the tax rate continues to rise, it may be the case that the incentive to earn more income begins to decline causing tax revenue to fall. If the tax rate was increased to 100 percent, there would be no incentive to earn income because it would all be taxed away; as a result, no tax revenue would be generated.

appendix

A Positive Relationship



The in-line skaters' practice times and scores in the competition are plotted on the graph. Each participant is represented by a point. The graph shows that those skaters who practised the most scored the highest. This is called a *positive, or direct, relationship*.

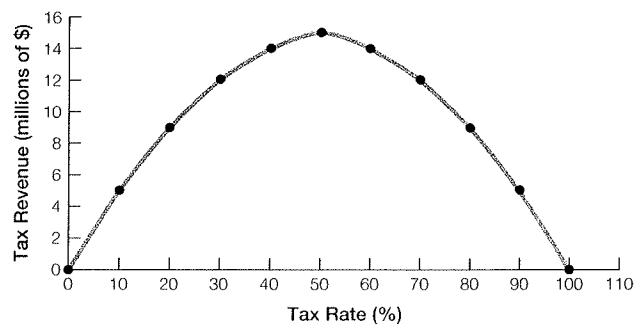
positive relationship
when two variables change in the same direction

negative relationship
when two variables change in opposite directions

appendix

Exhibit 4

Relationship with a Maximum



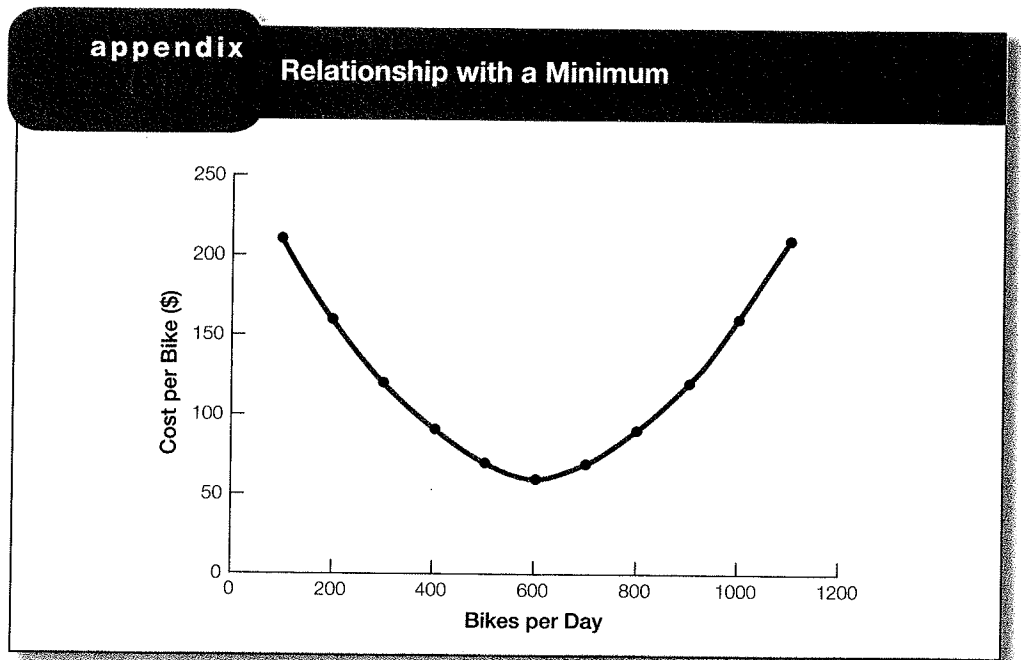
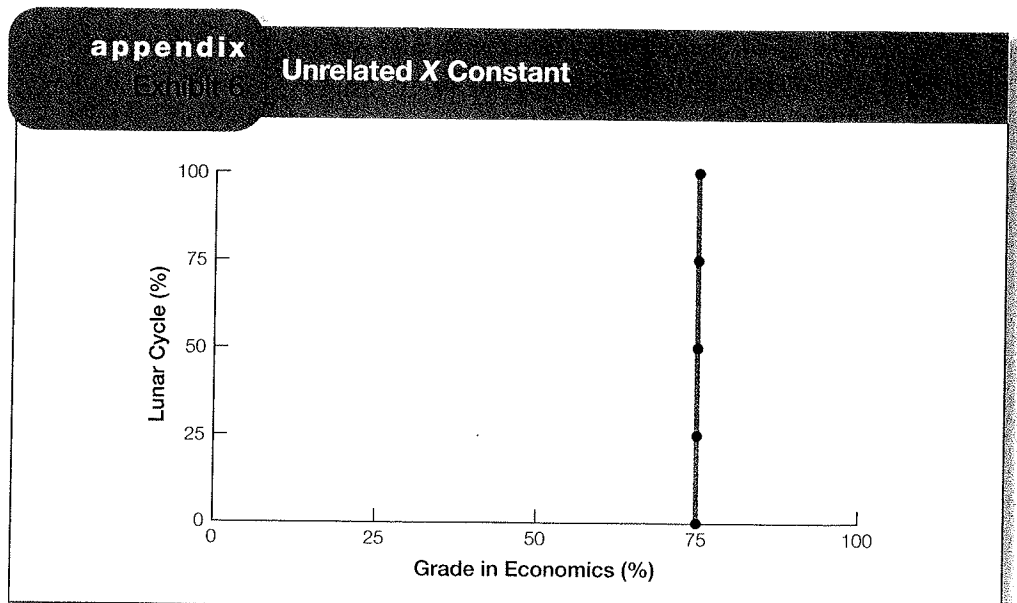


Exhibit 5 illustrates the opposite case—a relationship that begins negative, reaches a minimum, and then returns positive. Most economic costs are seen as following this relationship. As a bicycle manufacturer increases its output, per bike costs of production begin to fall, perhaps as workers develop special skills and the benefits of teamwork emerge. At a level of 600 bikes per day, the cost per bike is minimized at \$60 per bike. However, as production is increased beyond 600 bikes per day, the cost per bike begins to rise, perhaps as the bike factory is forced to operate beyond its efficient capacity.

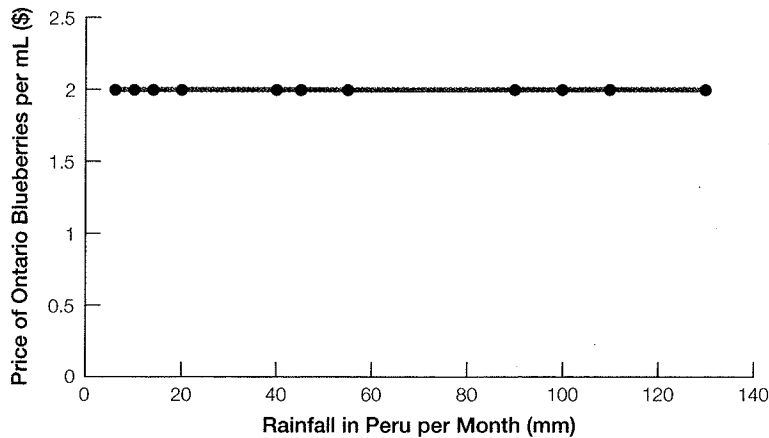
Variables That Are Not Related

There are still other situations in economics in which the change in one variable has no impact on the value of another variable. Exhibit 6 provides a graphical depiction of a curious relationship—a student's grade in economics and the lunar cycle. Since a



appendix

Unrelated Y Constant



student's grade in economics is not affected by the lunar cycle, no relationship exists. If a student grade of 75 percent is plotted on the horizontal axis, with the lunar cycle plotted on the vertical axis, the curve is vertical.

Exhibit 7 illustrates another curious relationship—the price of blueberries grown in Ontario and the average rainfall in Peru. Since the price of blueberries grown in Ontario, plotted on the vertical axis, does not vary with the monthly rainfall in Peru, plotted on the horizontal axis, the curve is horizontal.

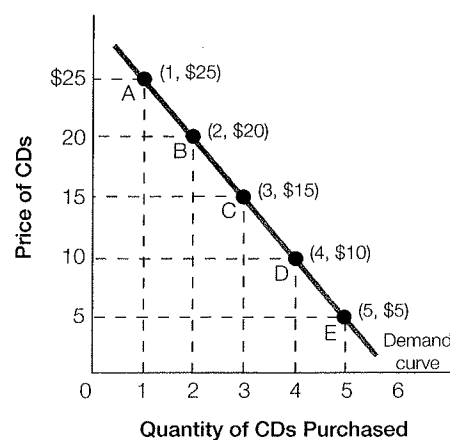
THE GRAPH OF A DEMAND CURVE

One of the most important graphs in all of economics is the demand curve. In Exhibit 8, we see Emily's individual demand curve for compact discs. It shows the price of CDs on the vertical axis and the quantity of CDs purchased per month on the horizontal axis. Every point in the space shown represents a price and quantity combination. The downward-sloping line, labelled *demand curve*, shows the different combinations of price and quantity purchased. Note that the higher you go up on the vertical (price) axis, the smaller the quantity purchased on the horizontal (quantity) axis, and the lower the price on the vertical axis, the greater the quantity purchased.

In Exhibit 8, we see that moving up the vertical price axis from the origin, the price of CDs increases from \$5 to \$25 in increments of \$5. Moving out along the horizontal quantity axis, the quantity purchased increases from zero to five CDs per month. Point A represents a price of \$25 and a quantity of one CD, point B represents a price of \$20 and a quantity of two CDs, point C, \$15 and a quantity of three CDs, and so on. When we connect all the points, we have what economists call a *curve*. As you can see, curves are sometimes drawn as straight lines for ease of illustration. Moving down along

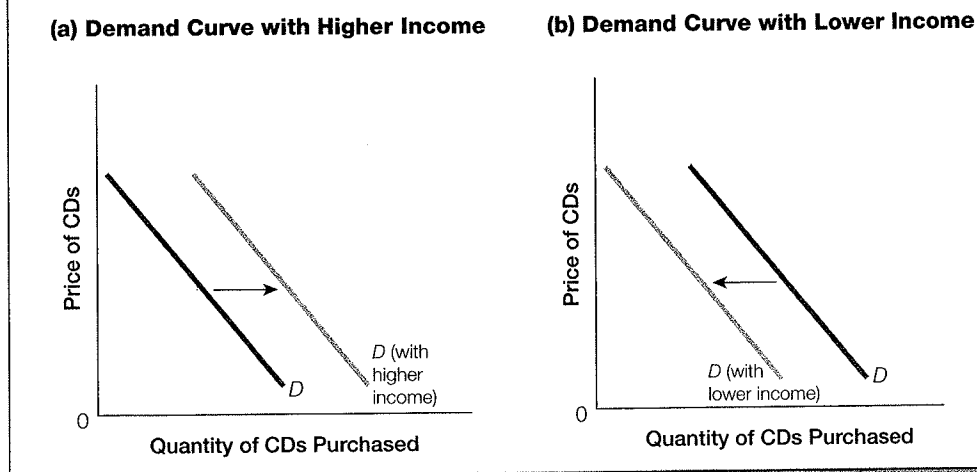
appendix

A Negative Relationship



The downward slope of the curve means that price and quantity purchased are inversely, or negatively, related: when one increases, the other decreases. That is, moving down along the demand curve from point A to point E, we see that as price falls, the quantity purchased increases. Moving up along the demand curve from point E to point A, we see that as the price increases, the quantity purchased falls.

appendix Shifting a Curve



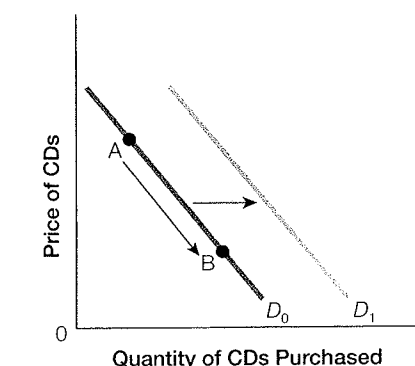
the curve, we see that as the price falls, a greater quantity is demanded; moving up the curve to higher prices, a smaller quantity is demanded. That is, when CDs become less expensive, Emily buys more CDs. When CDs become more expensive, Emily buys fewer CDs, perhaps choosing to go to the movies or buy a pizza instead.

USING GRAPHS TO SHOW THE RELATIONSHIP AMONG THREE VARIABLES

Although only two variables are shown on the axes, graphs can be used to show the relationship between three variables. For example, say we add a third variable—income—to our earlier example. Our three variables are now income, price, and quantity purchased. If Emily's income rises, say she gets a raise at work, she is now able and willing to buy more CDs than before at each possible price. As a result, the whole demand curve shifts outward (rightward) compared to the old curve. That is, she

uses some of her additional income to buy more CDs. This is seen in the graph in Exhibit 9(a). On the other hand, if her income falls, say she quits her job to go back to school, she now has less income to buy CDs. This causes the whole demand curve to shift inward (leftward) compared to the old curve. This is seen in the graph in Exhibit 9(b).

appendix Shifts versus Movements



The Difference between a Movement along and a Shift in the Curve

It is important to remember the difference between a movement between one point and another along a curve and a shift in the whole curve. A change in one of the variables on the graph, like price or quantity purchased, will cause a movement along the curve, say from point A to point B, as shown in Exhibit 10. A change in one of the

variables not shown (held constant in order to show only the relationship between price and quantity), like income in our example, will cause the whole curve to shift. The change from D_0 to D_1 in Exhibit 10 shows such a shift.

SLOPE

In economics, we sometimes refer to the steepness of the lines or curves on graphs as the **slope**—the ratio of the rise over the run. A slope can be either positive (upward sloping) or negative (downward sloping). A curve that is downward sloping represents an inverse, or negative, relationship between the two variables and slants downward from left to right, as seen in Exhibit 11(a). A curve that is upward sloping represents a direct, or positive, relationship between the two variables and slants upward from left to right, as seen in Exhibit 11(b). The numeric value of the slope shows the number of units of change of the Y -axis variable for each unit of change in the X -axis variable. Slope provides the direction (positive or negative) as well as the magnitude of the relationship between the two variables.

slope

the ratio of rise (change in the Y variable) over the run (change in the X variable)

Measuring the Slope of a Linear Curve

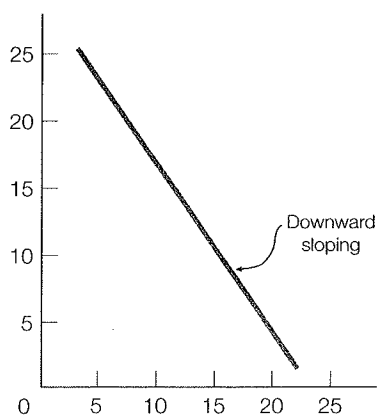
A straight-line curve is called a *linear curve*. The slope of a linear curve between two points measures the relative rates of change of two variables. Specifically, the slope of a linear curve can be defined as the ratio of the change in the Y value to the change in the X value. The slope can also be expressed as the ratio of the rise to the run, where the rise is the change in the Y variable (along the vertical axis) and the run is the change in the X variable (along the horizontal axis).

In Exhibit 12, we show two linear curves, one with a positive slope and one with a negative slope. In Exhibit 12(a), the slope of the positively sloped linear curve from point A to point B is $1/2$, because the rise is 1 (from 2 to 3) and the run is 2 (from 1 to 3). In Exhibit 12(b), the negatively sloped linear curve has a slope of -4 , a rise of -8 (a fall of 8 from 10 to 2) and a run of 2 (from 2 to 4), which gives us a slope of -4 ($-8/2$). Note the appropriate signs on the slopes: The negatively sloped line carries a minus sign and the positively sloped line, a plus sign.

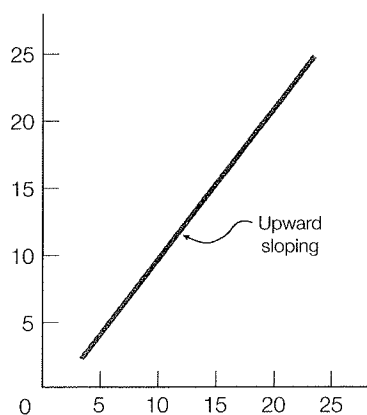
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Downward- and Upward-Sloping Linear Curves

(a) Downward-Sloping Linear Curve

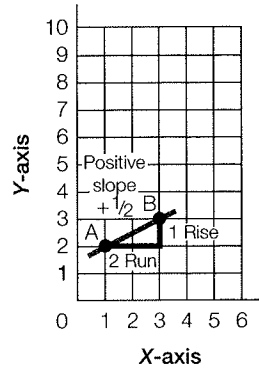


(b) Upward-Sloping Linear Curve

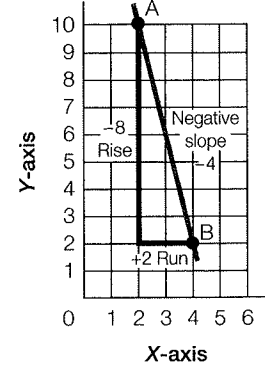


appendix Slopes of Positive and Negative Curves

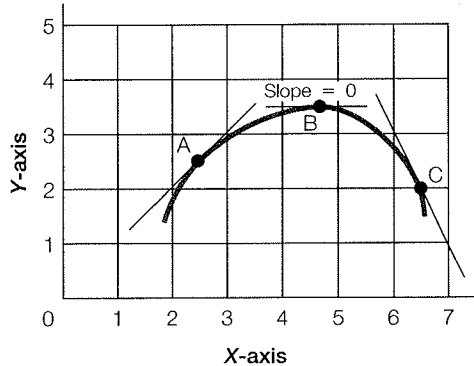
(a) Positive Slope



(b) Negative Slope



appendix The Slope of a Nonlinear Curve



Finding the Slope of a Nonlinear Curve

In Exhibit 13, we show the slope of a nonlinear curve. A nonlinear curve is a line that actually curves. Here the slope varies from point to point along the curve. However, we can find the slope of this curve at any given point by drawing a straight line tangent to that point on the curve. A tangency is when a straight line just touches the curve without actually crossing it. At point A, we see that the positively sloped line that is tangent to the curve has a slope of 1—the line rises one unit and runs one unit. At point B, the line is horizontal, so it has zero slope. At point C, we see a slope of -2 because the negatively sloped line has a rise of -2 units (a fall of two units) for every one unit run.

Remember, many students have problems with economics simply because they fail to understand graphs, so make sure that you understand this material before going on to Chapter 2.

Percentage Change

In economics, the determination of the percentage change in a quantity is a common calculation. The advantage of calculating percentage change (as opposed to simple absolute change) is that percentage change provides a more accurate measure of the magnitude of the change. For example, is an increase in price from \$105 to \$130 relatively larger or smaller than an increase in price from \$50 to \$75? In both cases, the difference (absolute increase) is the same at \$25, but what about the relative (percentage) change?

The Formula for Percentage Change

The percentage change in a value that is originally x_0 and changes to x_1 can be expressed as follows:

$$\% \Delta = \left(\frac{X_1 - X_0}{X_0} \right) \times 100$$

So, is an increase in price from \$105 to \$130 relatively larger or smaller than an increase in price from \$50 to \$75?

The percentage increase in price from \$105 to \$130 is

$$\left(\frac{130 - 105}{105} \right) \times 100 = 23.81\%$$

The percentage increase in price from \$50 to \$75 is

$$\left(\frac{75 - 50}{50} \right) \times 100 = 50\%$$

Therefore, the increase in price from \$50 to \$75 is relatively larger than the increase in price from \$105 to \$130.



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