Chapter 2

The Economic Problem

After studying this chapter you will be able to:

- Define the production possibilities frontier and calculate opportunity cost
- Distinguish between production possibilities and preferences and describe an efficient allocation of resources
- Explain how current production choices expand future production possibilities
- Explain how specialization and trade expand our production possibilities
- Describe alternative methods for coordinating choices and allocating resources

Good, Better, Best

What places limits on our ability to produce the things we want? How can we expand our capacity to produce? How do we benefit by trading with others? Does everyone gain in a market exchange, or does only the seller gain? Why have markets and private property evolved?

Production Possibilities and Opportunity Cost

Every working day, in mines and factories, shops and offices, on farms and construction sites, 150 million European workers produce a vast variety of goods and services valued at €50 billion. But the quantities of goods and services that we can produce are limited by both our available resources and by technology. And if we want to increase our production of one good, we must decrease our production of something else – we face trade-offs.

You are going to learn about the production possibilities frontier, which describes the limit to what we can produce and provides a neat way of thinking about and illustrating the idea of a trade-off.

The **production possibilities frontier** (*PPF*) is the boundary between those combinations of goods and services that can be produced and those that cannot. To illustrate the *PPF*, we focus on two goods at a time and hold the quantities produced of all the other goods and services constant. That is, we look at a *model* economy in which everything remains the same (*ceteris paribus*) except for the production of the two goods we are considering.

Let's look at the production possibilities frontier for CDs and pizza, which stand for *any* pair of goods or services.

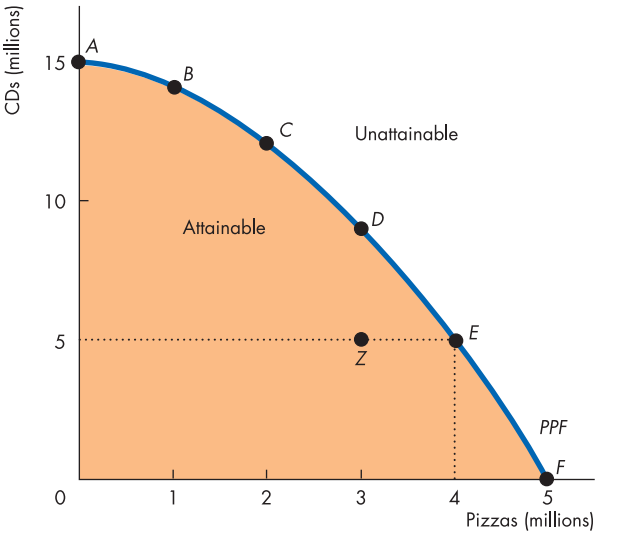
Production Possibilities Frontier

The *production possibilities frontier* for CDs and pizza shows the limits to the production of these two goods, given the total resources available to produce them. Figure 2.1 shows this production possibilities frontier. The table lists some combinations of the quantities of pizzas and CDs that can be produced in a month given the resources available. The figure graphs these combinations. The *x*-axis shows the quantity of pizzas produced, and the *y*-axis shows the quantity of CDs produced.

The *PPF* illustrates *scarcity* because we cannot attain the points outside the frontier. They are points that describe wants that can't be satisfied. We can produce at all the points *inside* the *PPF* and *on* the *PPF*. They are attainable points. Suppose that in a typical month, we produce 4 million pizzas and 5 million CDs. Figure 2.1 shows this combination as point *E* and as possibility *E* in the table. The figure also shows other production possibilities.

Figure 2.1

The Production Possibilities Frontier



Possibility	Pizzas (millions)		CDs (millions)
A	0	and	15
B	1	and	14
C	2	and	12
D	3	and	9
E	4	and	5
F	5	and	0

The table lists six points on the production possibilities frontier for CDs and pizza. Row *A* tells us that if we produce no pizza, the maximum quantity of CDs we can produce is 15 million. Points *A*, *B*, *C*, *D*, *E* and *F* in the figure represent the rows of the table. The line passing through these points is the production possibilities frontier (*PPF*).

The *PPF* separates the attainable from the unattainable. Production is possible at any point *inside* the orange area or *on* the frontier. Points outside the frontier are unattainable. Points inside the frontier such as point *Z* are inefficient because resources are either wasted or misallocated. At such points, it is possible to use the available resources to produce more of either or both goods.

For example, we might stop producing pizza and move all the people who produce it into producing CDs. Point *A* in the figure and possibility *A* in the table show this case. The quantity of CDs produced increases to 15 million, and pizza production dries up. Alternatively, we might close the CD factories and switch all the resources into producing pizza. In this situation, we produce 5 million pizzas. Point *F* in the figure and possibility *F* in the table show this case.

Production Efficiency

We achieve **production efficiency** if we cannot produce more of one good without producing less of some other good. When production is efficient, we are at a point *on* the *PPF*. If we are at a point *inside* the *PPF*, such as point *Z*, production is *inefficient* because we have some *unused* resources or we have some *misallocated* resources or both.

Resources are unused when they are idle but could be working. For example, we might leave some of the factories idle or some workers unemployed.

Resources are *misallocated* when they are assigned to tasks for which they are not the best match. For example, we might assign skilled pizza makers to work in a CD factory and skilled CD makers to work in a pizza shop. We could get more pizza *and* more CDs from these same workers if we reassigned them to the tasks that more closely match their skills.

If we produce at a point inside the *PPF* such as *Z*, we can use our resources more efficiently to produce more pizzas, more CDs, or more of *both* pizzas and CDs. But if we produce at a point *on* the *PPF*, we are using our resources efficiently and we can produce more of one good only if we produce less of the other. That is, along the *PPF*, we face a *trade-off*.

Trade-off Along the *PPF*

Every choice *along* the *PPF* involves a *trade-off* – we must give up something to get something else. On the *PPF* in Figure 2.1, we must give up some CDs to get more pizza or give up some pizza to get more CDs.

Trade-offs arise in every imaginable real-world situation, and you reviewed several of them in Chapter 1. At any given point in time, we have a fixed amount of labour, land, capital, and entrepreneurship. By using our available technologies, we can employ these resources to produce goods and services. But we are limited in what we can produce. This limit defines a boundary between what we can attain and what we cannot attain. This boundary is the real-world's production possibilities frontier, and it defines the trade-offs that we must make. On our real-world *PPF*, we can produce more of any one good or service only if we produce less of some other goods or services.

When doctors say that we must spend more on AIDS and cancer research, they are suggesting a trade-off: more medical research for less of some other things. When Tony Blair says that he wants to spend more on education and healthcare, he is suggesting a trade-off: more education and healthcare for less defence expenditure or less private spending (because of higher taxes). When an environmental group argues for less logging in tropical rainforests, it is suggesting a trade-off: greater conservation of endangered wildlife for less hardwood. When your parents say that you should study more, they are suggesting a trade-off: more study time for less leisure or sleep.

All trade-offs involve a cost – an opportunity cost.

Opportunity Cost

The *opportunity cost* of an action is the highest-valued alternative forgone. The *PPF* helps us to make the concept of opportunity cost precise and enables us to calculate it. Along the *PPF*, there are only two goods, so there is only one alternative forgone: some quantity of the other good. Given our current resources and technology, we can produce more pizzas only if we produce fewer CDs. The opportunity cost of producing an additional pizza is the number of CDs we *must* forgo. Similarly, the opportunity cost of producing an additional CD is the quantity of pizzas we *must* forgo.

For example, at point *C* in Figure 2.1, we produce fewer pizzas and more CDs than at point *D*. If we choose point *D* over point *C*, the additional 1 million pizzas *cost* 3 million CDs. One pizza costs 3 CDs.

We can also work out the opportunity cost of choosing point *C* over point *D* in Figure 2.1. If we move from point *D* to point *C*, the quantity of CDs produced increases by 3 million and the quantity of pizzas produced decreases by 1 million. So if we choose point *C* over point *D*, the additional 3 million CDs *cost* 1 million pizzas. So 1 CD costs 1/3 of a pizza.

Opportunity Cost is a Ratio

Opportunity cost is a ratio. It is the decrease in the quantity produced of one good divided by the increase in the quantity produced of another good as we move along the production possibilities frontier.

Because opportunity cost is a ratio, the opportunity cost of producing an additional CD is equal to the *inverse* of the opportunity cost of producing an additional pizza. Check this proposition by returning to the calculations we've just worked through. When we move along the *PPF* from *C* to *D*, the opportunity cost of a pizza is 3 CDs. The inverse of 3 is 1/3, so if we decrease the production of pizza and increase the production of CDs by moving from *D* to *C*, the opportunity cost of a CD must be 1/3 of a pizza. You can check that this number is correct. If we move from *D* to *C*, we produce 3 million more CDs and 1 million fewer pizzas. Because 3 million CDs cost 1 million pizzas, the opportunity cost of 1 CD is 1/3 of a pizza.

Increasing Opportunity Cost

The opportunity cost of a pizza increases as the quantity of pizzas produced increases. Also, the opportunity cost of a CD increases as the quantity of CDs produced increases. This phenomenon of increasing opportunity cost is reflected in the shape of the *PPF* – it is bowed outward.

When a large quantity of CDs and a small quantity of pizzas are produced – between points *A* and *B* in Figure 2.1 – the frontier has a gentle slope. A given increase in the quantity of pizzas *costs* a small decrease in the quantity of CDs, so the opportunity cost of a pizza is a small quantity of CDs.

When a large quantity of pizzas and a small quantity of CDs are produced – between points *E* and *F* in Figure 2.1 – the frontier is steep. A given increase in the quantity of pizzas *costs* a large decrease in the quantity of CDs, so the opportunity cost of a pizza is a large quantity of CDs.

The *PPF* is bowed outward because resources are not all equally productive in all activities. People with several years of experience working for Philips are good at producing CDs but not very good at making pizzas. So if we move some of these people from Philips to Domino's, we get a small increase in the quantity of pizzas but a large decrease in the quantity of CDs. Similarly, people who have spent years working at Domino's are good at producing pizzas, but they have no idea how to produce CDs. So if we move some of these people from Domino's to Philips, we get a small increase in the quantity of CDs but a large decrease in the quantity of pizzas. The more of either good we try to produce, the less productive are the additional resources we use to produce that good and the larger is the opportunity cost of a unit of that good.

Increasing Opportunity Costs are Everywhere

Just about every activity that you can think of is one with an increasing opportunity cost. We allocate the most skilful farmers and the most fertile land to the production of food. And we allocate the best doctors and the least fertile land to the production of healthcare services. If we shift fertile land and tractors away from farming to hospitals and ambulances and ask farmers to become hospital porters, the production of food drops drastically and the increase in the production of healthcare services is small. The opportunity cost of a unit of healthcare services rises. Similarly, if we shift our resources away from healthcare towards farming, we must use more doctors and nurses as farmers and more hospitals as hydroponic tomato factories. The decrease in the production of health-care services is large, but the increase in food production is small. The opportunity cost of a unit of food rises. This example is extreme and unlikely, but these same considerations apply to most pairs of goods.

There may be some rare situations in which opportunity cost is constant. Switching resources from bottling ketchup to bottling mayonnaise is a possible example. But in general, when resources are reallocated, they must be assigned to tasks for which they are an increasingly poor match. Increasing opportunity costs are a general fact of life.

Review Quiz

1. How does the production possibilities frontier illustrate scarcity?
2. How does the production possibilities frontier illustrate production efficiency?
3. How does the production possibilities frontier show that every choice involves a trade-off?
4. How does the production possibilities frontier illustrate opportunity cost?
5. Why is opportunity cost a ratio?
6. Why does the PPF for most goods bow outward, so that opportunity cost of a good increases as the quantity produced increases?

We've seen that what we can produce is limited by the production possibilities frontier. We've also seen that production on the *PPF* is efficient. But we can produce many different quantities on the *PPF*. How do we choose among them? How do we know which point on the *PPF* is the best one?

Using Resources Efficiently

You've seen that points inside the *PPF* waste resources or leave them unused and are inefficient. You've also seen that points *on* the *PPF* are efficient – we can't produce more of one good unless we forgo some units of another good. But there are many such points on the *PPF*. Each point on the *PPF* achieves production efficiency. What quantities of CDs and pizzas best serve the social interest?

This question is an example of real-world questions of enormous consequence such as: How much should we spend on treating AIDS and how much on cancer research? Should we expand education and healthcare programmes or cut taxes? Should we spend more on the preservation of rainforests and the conservation of endangered wildlife?

To answer these questions, we must find a way of measuring and comparing costs and benefits.

The *PPF* and Marginal Cost

The limits to production, which are summarized by the *PPF*, determine the marginal cost of each good or service. **Marginal cost** is the opportunity cost of producing *one more unit*. We can calculate marginal cost in a way that is similar to the way we calculate opportunity cost. *Marginal cost* is the opportunity cost of *one* additional pizza – the quantity of CDs that *must* be given up to get one more pizza – as we move along the *PPF*.

Figure 2.2 illustrates the marginal cost of pizza. If pizza production increases from zero to 1 million – a move from *A* to *B* – the quantity of CDs decreases from 15 million to 14 million. So the opportunity cost of a pizza is 1 CD.

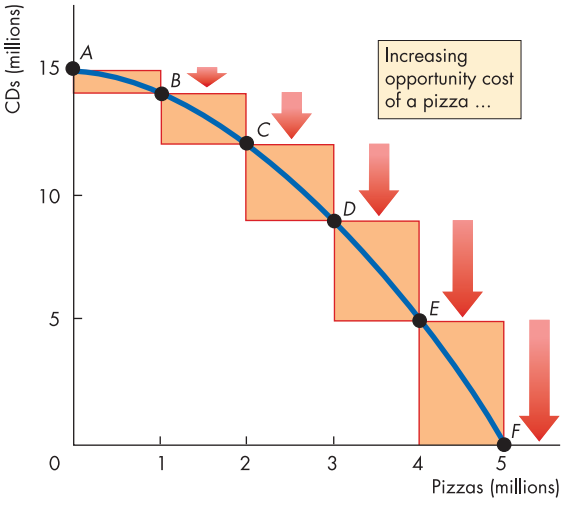
If pizza production increases from 1 million to 2 million – a move from *B* to *C* – the quantity of CDs decreases by 2 million. So the opportunity cost of a pizza is 2 CDs.

You can repeat this calculation for an increase in pizza production from 2 million to 3 million, from 3 million to 4 million, and finally from 4 million to 5 million. Figure 2.2 shows the opportunity costs as a series of steps. Each additional pizza costs more CDs than the preceding pizza.

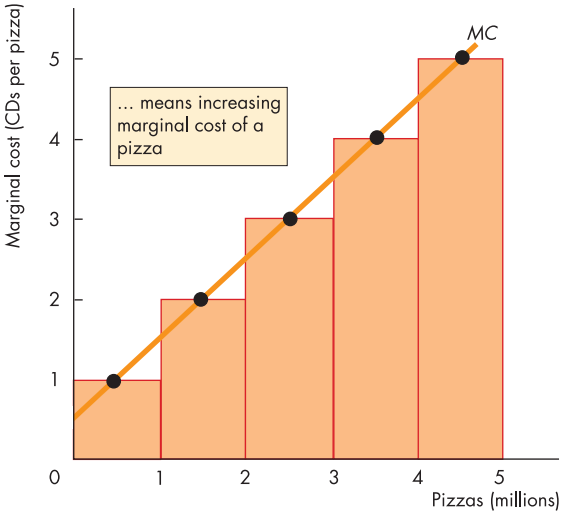
We've just calculated the opportunity cost of a pizza and generated the steps in Figure 2.2(a). The opportunity cost of a pizza is also the *marginal cost* of producing a pizza. In Figure 2.2(b), the line labelled *MC* shows the marginal cost.

Figure 2.2

The *PPF* and Marginal Cost



(a) *PPF* and opportunity cost



(b) Marginal cost

Opportunity cost is measured along the *PPF* in part (a). If the production of pizzas increases from zero to 1 million, the opportunity cost of a pizza is 1 CD. If the production of pizza increases from 1 million to 2 million, the opportunity cost of a pizza is 2 CDs. The opportunity cost of a pizza increases as the production of pizza increases. Part (b) shows the marginal cost of a pizza as the *MC* curve.

Preferences and Marginal Benefit

Look around your classroom and notice the wide variety of shirts, caps, trousers, and shoes that you and your fellow students are wearing today. Why is there such a huge variety? Why don't you all wear the same styles and colours? The answer lies in what economists call preferences. **Preferences** are a description of a person's likes and dislikes.

You've seen that we have a concrete way of describing the limits to production: the *PPF*. We need a similarly concrete way of describing preferences. To describe preferences, economists use the concept of marginal benefit. The **marginal benefit** of a good or service is the benefit received from consuming one more unit of it.

We measure the marginal benefit of a good or service by the most that people are *willing to pay* for an additional unit of it. The idea is that you are not willing to pay more for a good than it is worth to you. But you are willing to pay an amount up to what it is worth. So the willingness to pay for something measures its marginal benefit.

Economists use the marginal benefit curve to illustrate preferences. The **marginal benefit curve** shows the relationship between the marginal benefit of a good and the quantity of that good consumed. It is a general principle that the more we have of any good or service, the smaller is its marginal benefit and the less we are willing to pay for an additional unit of it. This tendency is so widespread and strong that we call it a principle – the *principle of decreasing marginal benefit*.

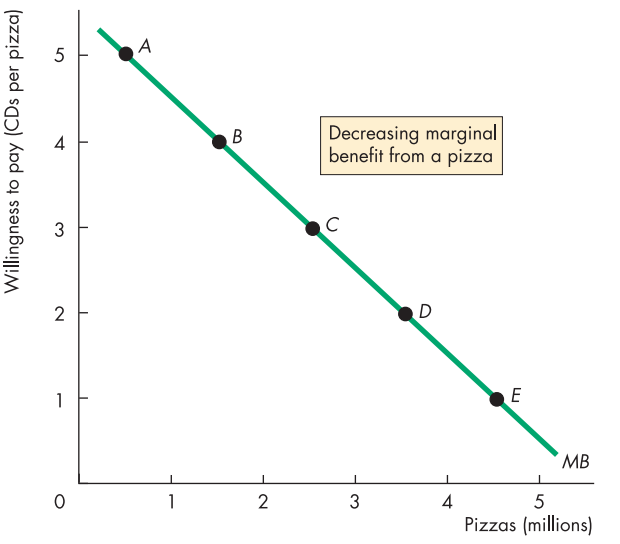
The basic reason why the marginal benefit of a good or service decreases as we consume more of it is that we like variety. The more we consume of any one good or service, the more we can see other things that we would like better.

Think about your willingness to pay for pizza (or any other item). If pizza is hard to come by and you can buy only a few slices a year, you might be willing to pay a high price to get an additional slice. But if pizza is all you've eaten for the past few days, you are willing to pay almost nothing for another slice.

In everyday life, we think of what we pay for goods and services as the money that we give up – pounds or euros. But you've learned to think about cost as other goods or services forgone, not a money cost. So you can think about willingness to pay in the same terms. The price you are willing to pay for something is the quantity of other goods and services that you are willing to forgo. Let's continue with the example of CDs and pizzas and illustrate preferences this way.

Figure 2.3

Preferences and the Marginal Benefit Curve



Possibility	Pizzas (millions)	Willingness to pay (CDs per pizza)
A	0.5	5
B	1.5	4
C	2.5	3
D	3.5	2
E	4.5	1

The smaller the quantity of pizzas produced, the more CDs people are willing to give up for an additional pizza. If pizza production is 0.5 million, people are willing to pay 5 CDs per pizza. But if pizza production is 4.5 milllion, people are willing to pay only 1 CD per pizza. Willingness to pay measures marginal benefit. And decreasing marginal benefit is a universal feature of people's preferences.

Figure 2.3 illustrates preferences as the willingness to pay for pizza in terms of CDs. In row *A*, pizza production is 0.5 million, and at that quantity, people are willing to pay 5 CDs per pizza. As the quantity of pizza produced increases, the amount that people are willing to pay for it falls. When pizza production is 4.5 million, people are willing to pay only 1 CD per pizza.

Let's now use the concepts of marginal cost and marginal benefit to describe the efficient quantity of pizzas to produce.

Efficient Use of Resources

When we cannot produce more of any one good without giving up some other good, we have achieved *production efficiency*, and we're producing at a point on the *PPF*. When we cannot produce more of any good without giving up some other good that we *value more highly*, we have achieved **allocative efficiency** and we are producing at the point on the *PPF* that we prefer above all other points.

Suppose in Figure 2.4, we produce 1.5 million pizzas. The marginal cost of a pizza is 2 CDs and the marginal benefit from a pizza is 4 CDs. Because someone values an additional pizza more highly than it costs to produce, we can get more value from our resources by moving some of them out of producing CDs and into producing pizzas.

Now suppose we produce 3.5 million pizzas. The marginal cost of a pizza is now 4 CDs, but the marginal benefit from a pizza is only 2 CDs. Because the additional pizza costs more to produce than anyone thinks it is worth, we can get more value from our resources by moving some of them away from producing pizzas and into producing CDs.

But suppose we produce 2.5 million pizzas. Marginal cost and marginal benefit are now equal at 3 CDs. This allocation of resources between pizzas and CDs is efficient. If more pizzas are produced, the forgone CDs are worth more than the additional pizzas.

If fewer pizzas are produced, the forgone pizzas are worth more than the additional CDs.

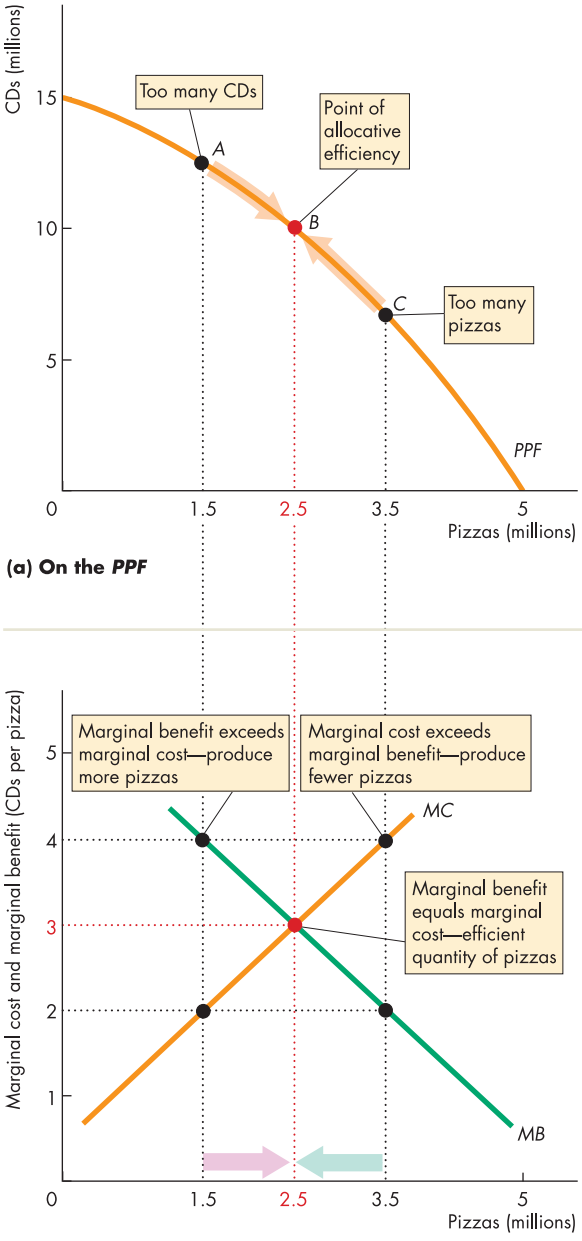
Review Quiz

1 What is marginal cost? How is it measured?
2 What is marginal benefit? How is it measured?
3 How does the marginal benefit from a good change as the quantity produced of that good increases?
4 What is production efficiency and how does it relate to the production possibilities frontier?
5 What is allocative efficiency and what conditions must be satisfied to achieve it?
6 Explain the distinction between production efficiency and allocative efficiency.

You now understand the limits to production and the conditions under which resources are used efficiently. Your next task is to study the expansion of production possibilities.

Figure 2.4

Efficient Use of Resources



The greater the quantity of pizzas produced, the smaller is the marginal benefit (*MB*) from pizza – the fewer CDs people are willing to give up to get an additional pizza. But the greater the quantity of pizzas produced, the greater is the marginal cost (*MC*) of pizza – the more CDs people must give up to get an additional pizza. When marginal benefit equals marginal cost, resources are being used efficiently.

Economic Growth

During the past 30 years, production per person in the European Union has more than doubled. During this same period, production per person has also doubled in North America and has expanded by an even larger amount in some Asian economies.

Such an expansion of production is called **economic growth**. Economic growth increases our *standard of living*. But the expansion of production possibilities does not overcome scarcity and avoid opportunity cost. We face a trade-off in the choices that make our economy grow. And the faster we make production grow, the greater is the opportunity cost of economic growth.

The Cost of Economic Growth

Two key factors influence economic growth: technological change and capital accumulation. **Technological change** is the development of new goods and of better ways of producing goods and services. **Capital accumulation** is the growth of capital resources, which includes *human capital*.

As a consequence of technological change and capital accumulation, we have an enormous quantity of cars that enable us to produce more transportation than was available when we had only horses and carriages; we have satellites that make global communications possible on a scale that is much larger than that produced by the earlier cable technology. But new technologies and new capital have an opportunity cost. To use resources in research and development and to produce new capital, we must decrease our production of consumption goods and services. Let's look at this opportunity cost.

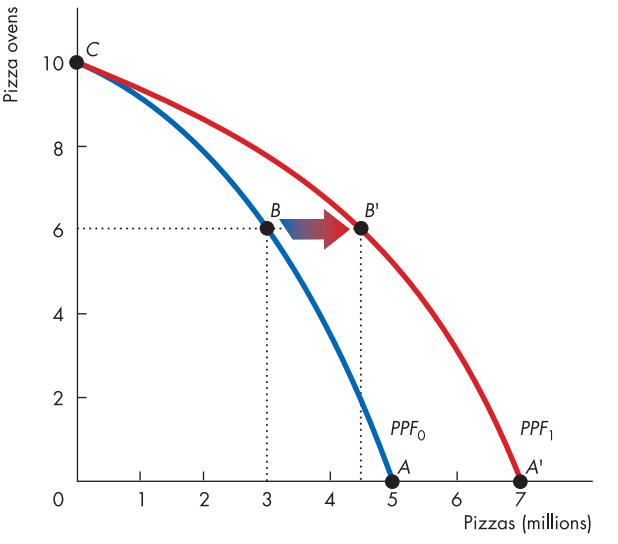
Instead of studying the *PPF* of pizzas and CDs, we'll hold the quantity of CDs produced constant and examine the *PPF* for pizzas and pizza ovens.

Figure 2.5 shows this *PPF* as the blue curve *ABC*. If we devote no resources to producing pizza ovens, we produce at point *A*. If we produce 3 million pizzas, we can produce 6 pizza ovens at point *B*. If we produce no pizza, we can produce 10 ovens at point *C*.

The amount by which our production possibilities expand depends on the resources we devote to technological change and capital accumulation. If we devote no resources to this activity (point *A*), our *PPF* remains at *ABC* – the blue curve in Figure 2.5. If we cut the current production of pizza and produce 6 ovens (point *B*), then in the future, we'll have more capital and our *PPF* will rotate outward to the position shown by the red curve. The fewer resources we devote to producing pizza and the more resources we devote to producing ovens, the greater is the expansion of our production possibilities.

Figure 2.5

Economic Growth



PPF_0 shows the limits to the production of pizza and pizza ovens, with the production of all other goods and services remaining the same. If we devote no resources to producing pizza ovens and produce 5 million pizzas, we remain at point *A*. But if we decrease pizza production to 3 million and produce 6 ovens, at point *B*, our production possibilities expand. After one period, the *PPF* rotates outward to PPF_1 and we can produce at point *B'*, a point outside the original *PPF*. We can rotate the *PPF* outward, but we cannot avoid opportunity cost. The opportunity cost of producing more pizzas in the future is fewer pizzas today.

Economic growth is not free. To make it happen, we devote resources to producing new ovens and less to producing pizza. In Figure 2.5, we move from *A* to *B*. There is no free lunch. The opportunity cost of more pizzas in the future is fewer pizzas today. Also, economic growth is no magic formula for abolishing scarcity. On the new production possibilities frontier, we continue to face a trade-off and opportunity cost.

The ideas about economic growth that we have explored in the setting of the pizza industry also apply to nations as you can see in the following box.

Box 2.1
Economic Growth in the European Union and Hong Kong

If a country devotes all its resources to producing consumption goods and none to research and capital accumulation, its production possibilities in the future will be the same as they are today. To expand our production possibilities in the future, we must devote fewer resources to producing consumption goods and some resources to accumulating capital and developing technologies so that we can produce more consumption goods in the future. The decrease in today's consumption is the opportunity cost of an increase in future consumption.

The experiences of the European Union and some East Asian economies such as Hong Kong make a striking example of the effects of our choices on the rate of economic growth. In 1970, the production possibilities per person in the European Union were much larger than those in Hong Kong. The member states of the European Union devoted one-fifth of their resources to accumulating capital and the other four-fifths to consumption. In 1970, the European Union was at point *A* on its *PPF* in Figure 1. Hong Kong devoted one-third of its resources to accumulating capital and two-thirds to consumption. In 1970, Hong Kong was at point *A* on its *PPF*.

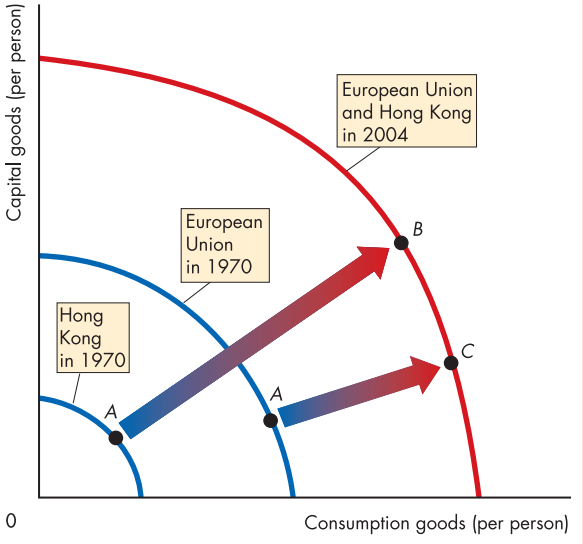
Since 1970, both countries have experienced economic growth, but growth in Hong Kong has been more rapid than that in the European Union. Because Hong Kong devoted a bigger fraction of its resources to accumulating capital, its production possibilities have expanded more quickly.

By 2004, the production possibilities per person in Hong Kong had reached a similar level to those in the European Union. If Hong Kong continues to devote more resources to accumulating capital than we do (at point *B* on its 2004 *PPF*), it will continue to grow more rapidly. But if Hong Kong increases consumption and decreases capital accumulation (moving to point *C* on its 2004 *PPF*), then its economic growth rate will slow.

The European Union is typical of the rich industrial countries, which include the United States, Canada and Japan. Hong Kong is typical of the fast-growing Asian economies, which include Taiwan, Thailand, South Korea and China. Growth in these countries slowed during the Asia crisis of 1998 but quickly rebounded. Production possibilities expand in these countries by between 5 and almost 10 per cent a year. If these high growth rates are maintained, these other Asian countries will eventually close the gap on the European Union as Hong Kong has done.

Figure 1

Economic Growth in the European Union and Hong Kong



Review Quiz

1. What are the two key factors that generate economic growth?
2. How does economic growth influence the production possibilities frontier?
3. What is the opportunity cost of economic growth?
4. Why has Hong Kong experienced faster economic growth than the European Union has?

Next, we're going to study another way in which we expand our production possibilities – the amazing fact that *both* buyers and sellers gain from specialization and trade.

Gains from Trade

People can produce for themselves all the goods that that they consume, or they can concentrate on producing one good (or perhaps a few goods) and then trade with others – exchange some of their own goods for those of others. Concentrating on the production of only one good or a few goods is called *specialization*.

We are going to discover how people gain by specializing in the production of the good in which they have a *comparative advantage* and trading with each other.

Comparative Advantage

A person has a **comparative advantage** in an activity if that person can perform the activity at a lower opportunity cost than anyone else. Differences in opportunity costs arise from differences in individual abilities and from differences in the characteristics of other resources.

No one excels at everything. One person is an outstanding batter but a poor catcher; another person is a brilliant lawyer but a poor teacher. In almost all human endeavours, what one person does easily, someone else finds difficult. The same applies to land and capital. One plot of land is fertile but has no mineral deposits; another plot of land has outstanding views but is infertile. One machine has great precision but is difficult to operate; another is fast but often breaks down.

Although no one excels at everything, some people excel and can outperform others in many activities. But such a person does not have a *comparative* advantage in each of those activities. For example, Maria Sharapova is a faster runner and better all-round athlete than most people. But she is an even better tennis player. Her *comparative* advantage is in playing tennis.

Because people's abilities and the quality of their resources differ, they have different opportunity costs of producing various goods. Such differences give rise to comparative advantage.

Let's explore the idea of comparative advantage by looking at two CD factories: one operated by Ace and the other by Galaxy. You will see how two producers can exploit comparative advantage to increase their total output. With specialization and exchange, we can produce and consume far greater quantities of goods and services than we would if we tried to produce for ourselves everything that we consume.

Production Without Trade

To simplify the story quite a lot, suppose that CDs have just two components: a disc and a plastic case. Ace and Galaxy each have a production line for discs and a production line for cases and each firm produces all its own discs and cases. Total production from each factory is 3,000 CDs (6,000 CDs in total) an hour.

Table 2.1 shows the production possibilities for each factory. Let's look carefully at the numbers.

Ace's Factory

Ace produces 3,000 discs and 3,000 cases: its possibility *B* in Table 2.1. But Ace can produce different quantities. If Ace uses all its resources to make discs, it can produce 12,000 discs an hour – possibility *E*. And if it uses all its resources to make cases, it can produce 4,000 cases an hour – possibility *A*. To produce more cases, Ace must decrease its production of discs. For each case produced, it must decrease its production of discs by 3. So

Ace's opportunity cost of producing 1 case is 3 discs.

Similarly, if Ace wants to increase its production of discs, it must decrease it production of cases. And for each 3,000 discs produced, it must decrease its production of cases by 1,000. So

Ace's opportunity cost of producing 1 disc is 1/3 of a case.

Table 2.1

Production Possibilities in Two Factories

Ace			Galaxy		
	Discs	Cases		Discs	Cases
Possibility	(thousands per hour)		Possibility	(thousands per hour)	
A	0	4	*E'*	0	12
B	**3**	**3**	*D'*	1	9
C	6	2	*C'*	2	6
D	9	1	***B'***	**3**	**3**
E	12	0	*A'*	4	0

Ace and Galaxy can produce discs and cases. The numbers show their production possibilities. If Ace produces possibility *B*, it can produce 3,000 cases and 3,000 discs an hour. If Galaxy produces possibility *B'*, it can produce 3,000 cases and 3,000 discs an hour.

Galaxy's Factory

Galaxy produces 3,000 discs and 3,000 cases: its possibility *B'* in Table 2.1. But Galaxy's factory has machines that are custom made for case production, so they are more suitable for producing cases than discs. And Galaxy's workers are more skilled in making cases.

These differences between the two factories mean that Galaxy's production possibilities are different from Ace's. If Galaxy uses all its resources to make discs, it can produce 4,000 an hour – possibility *A'*. If it uses all its resources to make cases, it can produce 12,000 an hour – possibility *E'*.

To produce more discs, Galaxy must decrease its production of cases. For each 1,000 additional discs produced, it must decrease its production of cases by 3,000. So

Galaxy's opportunity cost of producing 1 disc is 3 cases.

Similarly, if Galaxy wants to increase its production of cases, it must decrease its production of discs. For each 3,000 additional cases produced, it must decrease its production of discs by 1,000. So

Galaxy's opportunity cost of producing 1 case is 1/3 of a disc.

Differences in Opportunity Cost

Which of the two producers has a comparative advantage in producing discs and which in producing cases? Recall that comparative advantage arises from differences in opportunity cost. Which of the two producers has the lower opportunity cost of discs and which has the lower opportunity cost of cases?

You can see that Galaxy has a lower opportunity cost of producing cases. Galaxy's opportunity cost of a case is 1/3 of a disc, whereas Ace's is 3 discs. So Galaxy has a comparative advantage at producing cases.

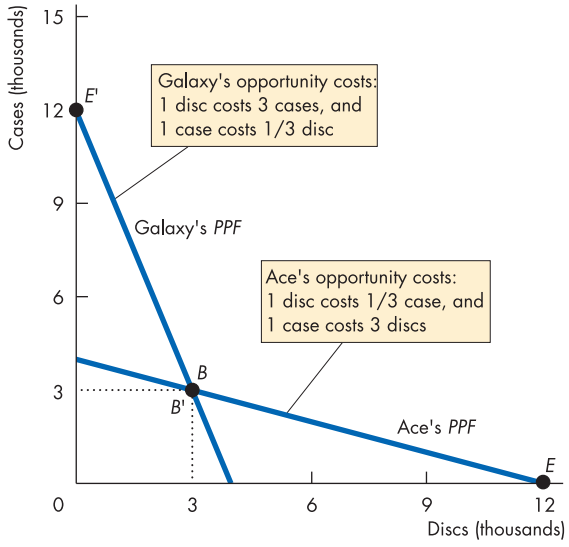
You can also see that Ace has a lower opportunity cost of producing discs. Ace's opportunity cost of a disc is 1/3 of a case, whereas Galaxy's is 3 cases. So Ace has a comparative advantage at producing discs.

Because Galaxy has a comparative advantage in producing cases and Ace has a comparative advantage in producing discs, both Ace and Galaxy can gain from specialization and trade with each other.

Figure 2.6 shows Ace's and Galaxy's production possibilities frontiers and summarizes the above discussion.

Figure 2.6

Comparative Advantage



Along Ace's *PPF*, the opportunity cost of 1 disc is 1/3 of a case and the opportunity cost of 1 case is 3 discs. Along Galaxy's *PPF*, the opportunity cost of 1 disc is 3 cases. Ace and Galaxy produce 3,000 cases and 3,000 discs an hour. Galaxy's opportunity cost of cases is less than Ace's, so Galaxy has a comparative advantage in cases. Ace's opportunity cost of discs is less than Galaxy's, so Ace has a comparative advantage in discs.

Achieving the Gains from Trade

If Ace, which has a comparative advantage in producing discs, puts all its resources into that activity, it can produce 12,000 discs an hour – point *E* on its *PPF*. If Galaxy, which has a comparative advantage in producing cases, puts all its resources into that activity, it can produce 12,000 cases an hour – point *E'* on its *PPF*.

By specializing, Ace and Galaxy together can produce 12,000 cases and 12,000 discs an hour, double the total production they can achieve without specialization.

By specialization and trade, Ace and Galaxy can get *outside* their individual production possibilities frontiers. To achieve the gains from specialization, Ace and Galaxy must trade with each other.

Table 2.2 and Figure 2.7 show how Ace and Galaxy gain from trade. They make the following deal: Ace agrees to increase its production of discs from 3,000 an hour to 12,000 an hour – a move along its *PPF* from

point *B* to point *E* in Figure 2.7(a). Galaxy agrees to increase its production of cases from 3,000 an hour to 12,000 an hour – a move along its *PPF* from point *B'* to point *E'* in Figure 2.7(b).

They also agree to trade cases and discs at a "price" of one case for one disc. So Ace sells discs to Galaxy for one case per disc, and Galaxy sells cases to Ace for one disc per case.

With this deal in place, Ace and Galaxy exchange along the red "Trade line". They exchange 6,000 cases and 6,000 discs, and Ace moves to point *F* and Galaxy moves to point *F'*.

Each now has 6,000 discs and 6,000 cases, or 6,000 CDs. So each now produces 6,000 CDs an hour – double the previous production rate. This increase in production of 6,000 CDs an hour is the gain from specialization and trade.

Both parties to the trade share the gains. Galaxy, which can produce discs at an opportunity cost of 3 cases per disc, can buy discs from Ace at a cost of 1 case per disc. Ace, which can produce cases at an opportunity cost of 3 discs per case, can buy cases from Galaxy at a cost of 1 disc per case.

Table 2.2

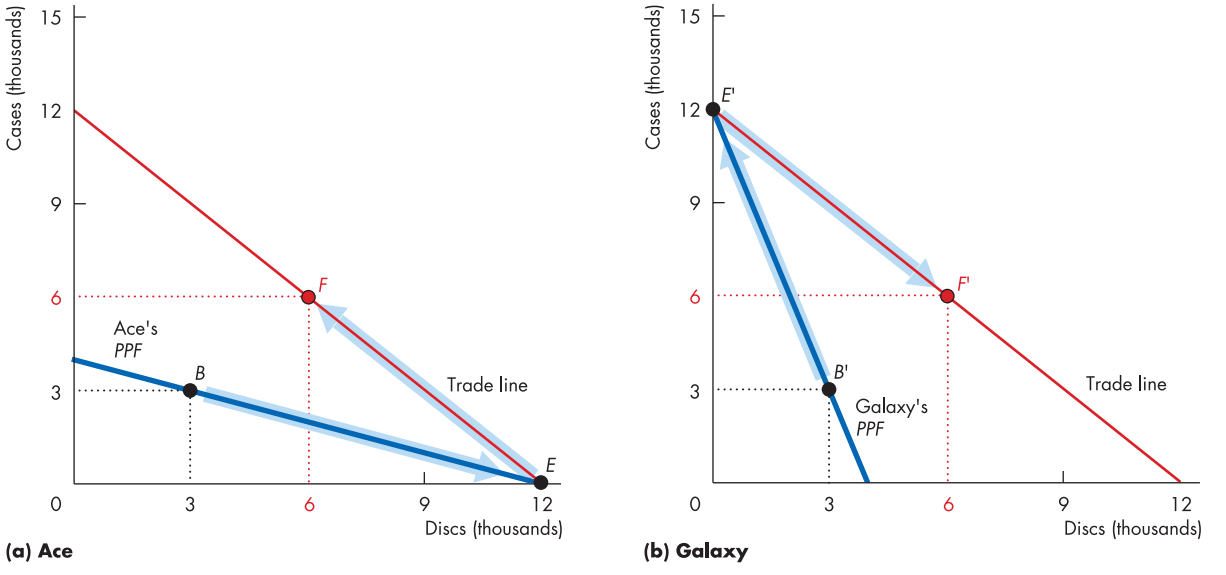
Achieving the Gains from Specialization

Ace			Galaxy		
	Discs	Cases		Discs	Cases
Possibility	(thousands per hour)		Possibility	(thousands per hour)	
A	0	4	***E'***	**0**	**12**
B	**3**	**3**	*D'*	1	9
C	6	2	*C'*	2	6
D	9	1	***B'***	**3**	**3**
E	**12**	**0**	*A'*	4	0

Ace and Galaxy can produce discs and cases. The numbers in the table show their production possibilities. For Ace, the opportunity cost of 1 disc is 1/3 of a case and the opportunity cost of 1 case is 3 discs. If Ace produces on row *B*, it can produce 3,000 cases and 3,000 discs an hour. For Galaxy, the opportunity cost of 1 disc is 3 cases and the opportunity cost of 1 case is 1/3 of a disc. If Galaxy produces on row *B'*, it can produce 3,000 cases and 3,000 discs an hour.

Figure 2.7

The Gains from Trade



Ace and Galaxy initially produce at points *B* and *B'* on their respective *PPF*s. Ace has a comparative advantage in discs, and Galaxy has a comparative advantage in cases. If Ace specializes in discs, it produces at point *E* on its *PPF*. If Galaxy specializes in cases, it produces at point *E'* on its *PPF*. They exchange cases for discs along the red "Trade line".

Galaxy buys discs from Ace for less than its opportunity cost of producing them, and Ace buys cases from Galaxy for less than its opportunity cost of producing them. Ace goes to point *F* and Galaxy goes to point *F'* – points outside their individual *PPF*s – where each produces 6,000 CDs an hour. Ace and Galaxy increase production with no change in resources.

For Galaxy, the cost of a disc falls from 3 cases to 1 case. So it gets its discs more cheaply than it can produce them itself. For Ace, the cost of a case falls from 3 discs to 1 disc. So it gets its cases more cheaply than it can produce them itself. Because both Ace and Galaxy obtain the items they buy from the other at a lower cost than that at which they can produce the items themselves, they both gain from specialization and trade.

Gains from Trade in the Global Economy

The gains that we achieve from international trade are also similar to those achieved by Ace and Galaxy. When Europeans buy T-shirts from China and when China buys Airbus airplanes, both the Chinese and Europeans gain. Europeans get shirts at a lower cost than that at which firms in Europe can produce them, and the Chinese get their planes at a lower cost than that at which Chinese firms can produce them.

Ace and Galaxy are equally productive. Ace can produce the same quantities of discs as Galaxy can produce cases. But this equal productivity is not the source of the gains from specialization and trade. The gains arise from *comparative* advantage and would be available even if one of the trading partners was much more productive than the other. To see that the gains arise from comparative advantage, let's look again at Ace and Galaxy but with Galaxy being much more productive than before.

Absolute Advantage

A person has an **absolute advantage** if that person can produce more goods with a given amount of resources than another person can. Absolute advantage arises from differences in productivity. A person who has better technology, more capital, or is more skilled than another person has an absolute advantage. Absolute advantage also applies to firms and to nations.

The gains from trade arise from *comparative* advantage, so people can gain from trade in the presence of *absolute* advantage. To see how, suppose that Galaxy invents and patents a new production process that makes it *four* times as productive as it was before in the production of both cases and discs. With its new technology, Galaxy can produce 48,000 cases an hour (4 times the original 12,000) if it puts all its resources into making cases. Alternatively, it can produce 12,000 discs (4 times the original 3,000) if it puts all its resources into making discs. Galaxy now has an absolute advantage.

But Galaxy's *opportunity cost* of 1 disc is still 3 cases. And this opportunity cost is higher than Ace's. So Galaxy can still get discs at a lower cost by exchanging cases for discs with Ace.

In this example, Galaxy will no longer produce only cases – it will produce some discs as well. But Ace will fully specialize in producing discs.

The key point to recognize is that even though someone (or some nation) has an absolute advantage, this fact does not destroy comparative advantage.

Dynamic Comparative Advantage

At any given point in time, the resources and technologies available determine the comparative advantages that individuals and nations have. But just by repeatedly producing a particular good or service, people become more productive in that activity, a phenomenon called **learning-by-doing**. Learning-by-doing is the basis of *dynamic* comparative advantage.

Dynamic comparative advantage is a comparative advantage that a person (or a business or a country) possesses as a result of having specialized in a particular activity and, as a result of learning-by-doing, having become the producer with the lowest opportunity cost.

Hong Kong and Singapore are examples of countries that have pursued dynamic comparative advantage vigorously. They have developed industries such as biotechnology in which initially they did not have a comparative advantage but, through learning-by-doing, became low opportunity cost producers in those industries.

Review Quiz

1 What gives a person, a business or a country a comparative advantage?
2 Is production still efficient when people specialize?
3 Why do people specialize and trade?
4 What are the gains from specialization and trade?
5 What is the source of the gains from trade?
6 Distinguish between comparative advantage and absolute advantage.
7 How does dynamic comparative advantage arise?

Coordinating Choices and Allocating Resources

You've seen how people can gain by specializing at producing those goods and services in which they have a comparative advantage and trading with each other. But for 6 billion individuals to specialize and produce millions of different goods and services, choices must be coordinated. And the millions of goods and services that they produce must be allocated to the people who will use and consume them.

Many possible methods are available for coordinating choices and allocating resources and they can be placed into three broad groups:

- Commands
- Rules and conventions
- Markets

Commands

Commands or orders can coordinate choices and allocate resources. These commands might be backed up by force or some form of voluntary agreement such as the majority rule or an employment agreement.

When a command system is used to coordinate an entire economy and allocate almost all of the economy's resources, the economic system is a **planned economy**. Before the collapse of the Soviet Union in the early 1990s, Russia and several other Eastern European and Asian countries were planned economies. And before the 1980s, China was a planned economy. Today, only North Korea and Cuba are planned economies.

Experience with planned economies is generally unfavourable. Such an economy can work when there is a clear national objective such as winning a war. But in normal times, a planning system is too bureaucratic to do an efficient job.

Command systems play an important role in smaller organizations than entire nations. They are used in businesses or what economists call firms. A **firm** is an economic unit that employs factors of production and organizes them to produce and sell goods and services. Tesco and Virgin Atlantic are examples of firms.

A firm uses a command system when a manager gives an instruction to a worker and then monitors that worker's performance. Commands in firms coordinate a huge amount of economic activity. The mobile phone maker Nokia, for example, coordinates the production of the many components that go into a mobile phone and coordinates the marketing and distribution of its products.

But a firm can get too big. It can become too costly to keep track of all the information that a firm needs to coordinate its activities. For this reason, all firms specialize and trade with each other – like Ace and Galaxy do in the example you've just studied.

For example, Britain's largest retailer, Tesco, could produce all the things that it sells in its stores. And it could produce all the raw materials that are used to produce the things that it sells. But if Tesco did behave in this way, it would not remain Britain's largest retailer for very long. It would not be exploiting its comparative advantage and would be producing many items that it could buy at a lower cost from other firms.

Rules and Conventions

Rules and conventions are used to coordinate choices and allocate resources. Some examples are: winner takes all contests; first-come-first-served; equal shares for all; and women and children first.

For example, we use contests to get the best performance out of professional athletes, tennis players and golfers. And we use equal shares in allocating votes for publicly provided resources and in allocating access to necessities such as basic health services.

Like commands, rules and conventions cannot bear the entire burden of ensuring that our choices get coordinated and resources get used efficiently.

The most widely used method is the third: markets.

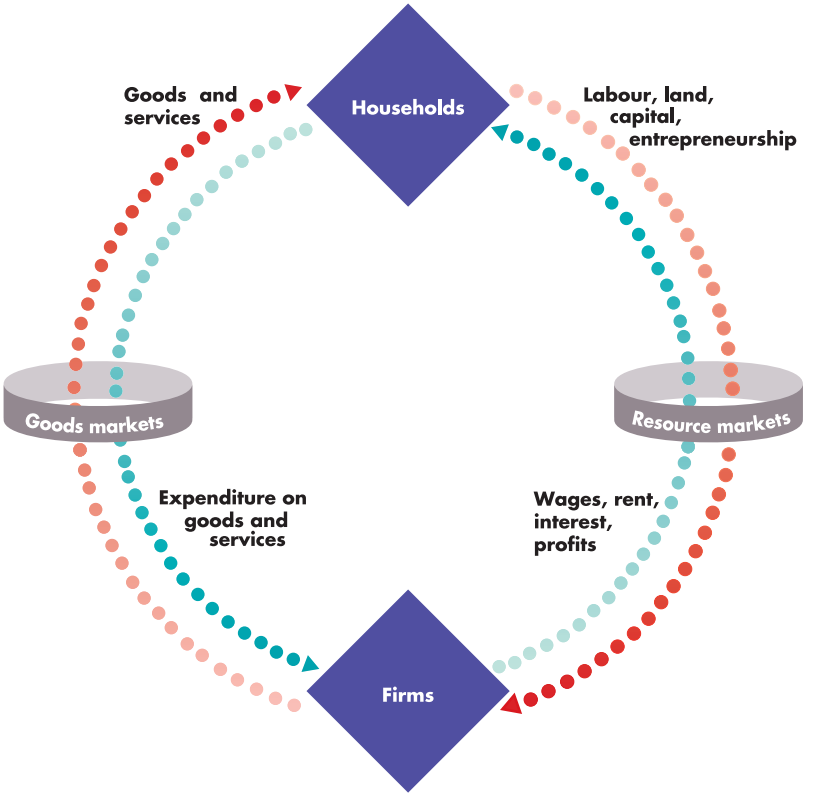
Markets

In ordinary speech, the word *market* means a place where people buy and sell goods such as fish, meat, fruits, and vegetables. In economics, a *market* has a more general meaning. A **market** is any arrangement that enables buyers and sellers to get information and to do business with each other. An example is the global market in oil. This market is not a place. It is a network of oil producers, users, wholesalers, brokers and others who buy and sell oil.

Markets have evolved because they coordinate choices. In organized markets, enterprising individuals and firms, each pursuing their own self-interest, profit from buying or selling the items in which they specialize. But markets can work only when property rights exist.

Figure 2.8

Circular Flows in the Market Economy



Households and firms make economic choices. Households choose the quantities of labour, land, capital, and entrepreneurship to sell or rent to firms in exchange for wages, rent, interest, and profit. Households also choose how to spend their incomes on the various types of goods and services available. Firms choose the quantities of factors of production to hire and the quantities of the various goods and services to produce. Goods markets and factor markets coordinate these choices of households and firms. Factors of production and goods flow clockwise (red), and money payments flow counter clockwise (green).

Property rights are social arrangements that govern the ownership, use and disposal of resources, goods, and services. Property rights extend to *real property* (land, buildings and durable goods such as plant and equipment) *financial property* (shares, bonds and money in the bank) and *intellectual property* (books, music, computer programs and inventions).

Circular Flows Through Markets

Figure 2.8 shows the flows that result from the choices that households and firms make and its note describes these flows.

How Markets Coordinate Choices

Markets coordinate individual decisions through price adjustments. Suppose there is a shortage of fresh-baked bread. A rise in the price of fresh-baked bread encourages bakers to produce more and encourages some consumers to switch from fresh-baked bread to packaged bread. The shortage disappears and the choices of sellers and buyers are coordinated.

Similarly, if there is a surplus of fresh-baked bread, a fall in its price encourages bakers to produce less and encourages some consumers to switch from packaged bread to fresh-baked bread. The surplus disappears and the choices of sellers and buyers are coordinated.

Review Quiz

1 Why are social arrangements such as markets and property rights necessary?
2 What are the main functions of markets?

Your next task is to learn more about how markets work. But first, you can put what you've learned in this chapter to work in *Reading Between the Lines* on pp. 46–47, which explores the opportunity cost of the choices facing school leavers.

Reading Between the Lines

Opportunity Cost: A Student's Choice

By Justin Parkinson BBC NEWS:
http://news.bbc.co.uk/go/pr/fr/-/1/hi/education/3046985.stm
Published: 2003/05/21 13:20:12 GMT

Tuition fees 'justified by earnings'

Plans to allow prestigious universities to charge up to £3,000 a year for courses are justified by their students' higher future earnings, a study suggests.

Graduates from the Russell Group[1] – which represents 19 of the UK's leading universities – can expect to make between £9,000 and £22,000 more over a lifetime than their counterparts from newer institutions, researchers at the London School of Economics (LSE) found. The government is planning to allow higher fees to be charged for some courses from 2006 . . .

Higher education minister Margaret Hodge said, "By asking everyone to pay the same tuition fee regardless of the university they go to, we have been implying the benefits of every university are the same. They are not. By enabling universities to charge differential fees, we are… recognising difference, diversity and the premium that some universities can give you over others. This is an economic justification for allowing some universities to charge more than others. If potential students thought and acted rationally, then they would be willing to invest more in universities that offered them a better return on their investment."

The earnings of groups of graduates from 1985, 1990 and 1995 were evaluated for the study. They had all previously achieved similar results at A-level and had come from similar social backgrounds. Researchers found those who had attended a Russell Group institution could expect to earn 6% more than graduates of newer universities. If the difference in fees was decided by labour market values, prestigious universities could charge up to £7,250 a year more, they added. . . .

[1] The English universities in the Russell Group are Birmingham, Bristol, Cambridge, Imperial College, Kings College London, Leeds, Liverpool, London School of Economics, Manchester, Newcastle, Nottingham, Oxford, Sheffield, Southampton, University College London and Warwick. The other members are Cardiff, Edinburgh and Glasgow.

The Essence of the Story

- Universities in the Russell Group want to charge tuition fees that exceed the new £3,000 limit.
- The higher education minister says that if students behave rationally, they will be willing to pay more for an education in a university that generates a higher return from that education.
- Universities in the Russell Group say that their graduates earn 6 per cent more than graduates of new universities and this greater rate of return justifies a higher tuition fee.

Economic Analysis

- The opportunity cost of a university education is consumption goods and services forgone.
- The return to a university education is an increase in lifetime production possibilities that increases future consumption.
- Figure 1 shows the rate of return on a university education – the increase in salary generated by university education minus the cost of a university education, expressed as a percentage of the cost. A university education generates a higher rate of return than other types of investment.
- Figure 2 illustrates the limits to a school leaver's choices. If the student decides not to attend university, her consumption is limited by the blue *PPF*. She consumes no educational goods and services and is at point *A*.
- Working full time, the school leaver has an income of £14,000 a year and remains on the blue *PPF*.
- By attending university, the student incurs an opportunity cost. She moves from point *A* to point *B* along her *PPF*, forgoes £7,000 of current consumption and consumes £10,000 of educational goods and services.
- As a graduate of a new university, she can earn £19,000 working full time, so her production possibilities expand to the purple *PPF* in Figure 2. She consumes at point *C*.
- As a graduate of a university in the Russell Group, she can earn £25,000 working full time, so her production possibilities expand to the red *PPF* in Figure 2. She consumes at point *D*.
- A school leaver might be willing to pay a higher tuition fee to get to the red *PPF* in Figure 2. In this case, she would forgo more than £7,000 of current consumption and move to a point on the blue *PPF* to the left of *B*.

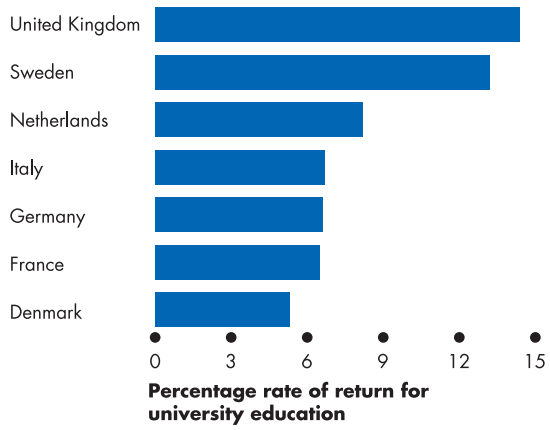


Figure 1 Returns from university education

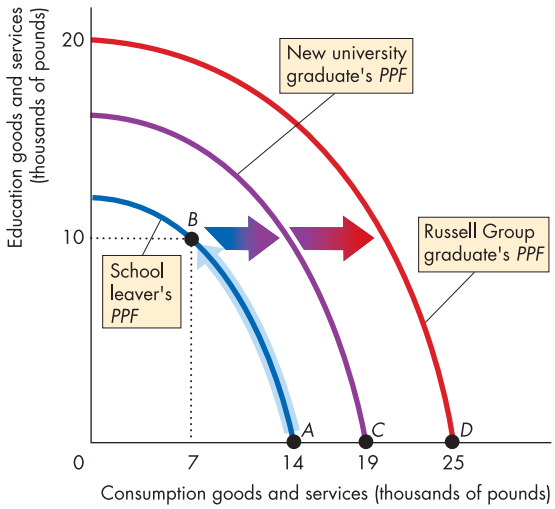


Figure 2 School leaver's choices

Summary

Key Points

Production Possibilities and Opportunity Cost (pp. 32–34)

- The production possibilities frontier, *PPF*, is the boundary between attainable and unattainable production.
- Production efficiency occurs at points on the *PPF*.
- Along the *PPF*, the opportunity cost of producing more of one good is the amount of the other good that must be given up.
- The opportunity cost of all goods increases as production of the good increases.

Using Resources Efficiently (pp. 35–37)

- The marginal cost of a good is the opportunity cost of producing one more unit.
- The marginal benefit from a good is the maximum amount of another good that a person is willing to forgo to obtain more of the first good.
- The marginal benefit of a good decreases as the amount of the good available increases.
- Resources are used efficiently when the marginal cost of each good is equal to its marginal benefit.

Economic Growth (pp. 38–39)

- Economic growth, which is the expansion of production possibilities, results from capital accumulation and technological change.
- The opportunity cost of economic growth is forgone current consumption.

Gains from Trade (pp. 40–43)

- A person has a comparative advantage in producing a good if that person can produce the good at a lower opportunity cost than everyone else.
- People gain by specializing in the activity in which they have a comparative advantage and trading.
- Dynamic comparative advantage arises from learning-by-doing.

Coordinating Choices and Allocating Resources (pp. 44–45)

- Choices are coordinated and resources are allocated by commands, by rules and conventions, and by markets.
- Using commands, firms coordinate a large amount of economic activity, but there is a limit to the efficient size of a firm.
- Markets coordinate the economic choices of people and firms.
- Markets can work efficiently only when property rights exist.

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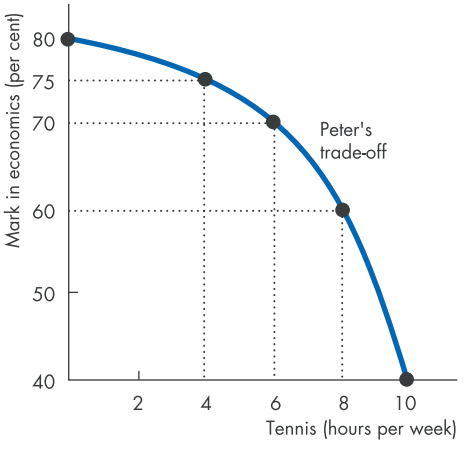
Problems

***1** Use the graph below to calculate Peter's opportunity cost of an hour of tennis when he increases the time he plays tennis from:

a 4 to 6 hours a week.

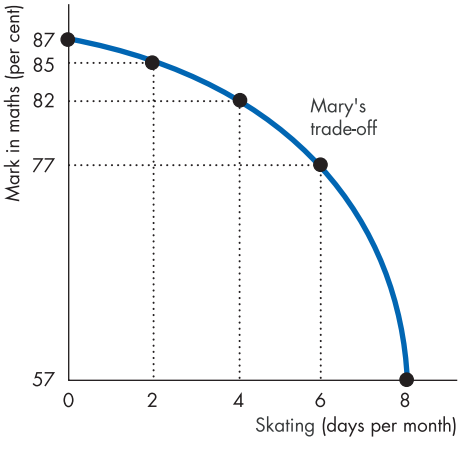
b 6 to 8 hours a week.



2 Use the graph to calculate Mary's opportunity cost of an hour of skating when she increases her time spent skating from:

a 2 to 4 hours a week.

b 4 to 6 hours a week.

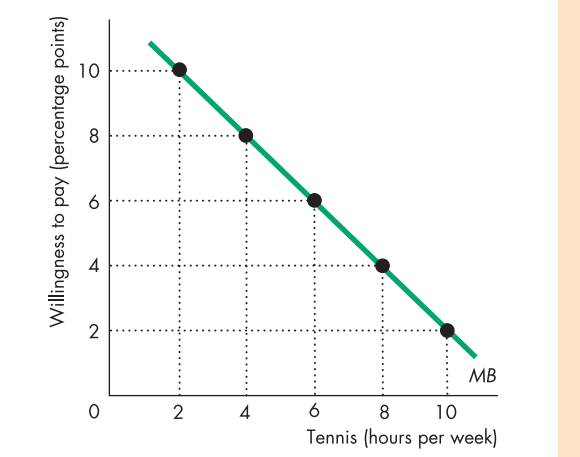


***3** In problem 1, describe the relationship between the time Peter spends playing tennis and the opportunity cost of an hour of tennis.

4 In problem 2, describe the relationship between the time Mary spends skating and the opportunity cost of an hour of skating.

*Solutions to odd-numbered problems are available on *Parkin Interactive*.

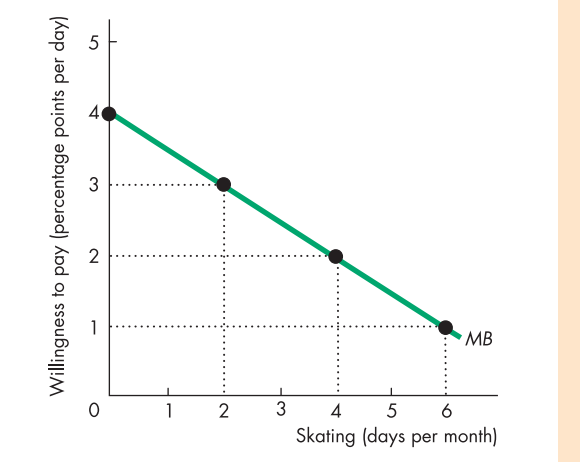
***5** Peter, in problem 1, has the marginal benefit curve shown in the graph at the top of the next column:



a If Peter is efficient, what his mark?

b Why would Peter be worse off getting a higher mark?

6 Mary, in problem 2, has the following marginal benefit curve:



a If Mary is efficient, how much does she skate?

b Why would Mary be worse off if she spent more time skating?

***7** Leisureland's production possibilities in 2004 are:

Food (kilograms per month)		Sunscreen (litres per month)
300	and	0
200	and	50
100	and	100
0	and	150

a Draw a graph of Leisureland's production possibilities frontier in 2004.

b What are Leisureland's opportunity costs of producing food and sunscreen at each output in the table?

8 Jane's Island's production possibilities are:

Corn (kilograms per month)		Cloth (metres per month)
3	and	0
2	and	2
1	and	4
0	and	6

a Draw a graph of the *PPF* on Jane's Island.

b What are Jane's opportunity costs of producing corn and cloth at each output in the table?

***9** In problem 7, to get a litre of sunscreen the people of Sunland are willing to give up 5 kilograms of food if they have 25 litres of sunscreen, 2 kilograms of food if they have 75 litres of sunscreen, and 1 kilogram of food if they have 125 litres of sunscreen.

a Draw a graph of Sunland's marginal benefit from sunscreen.

b What is the efficient quantity of sunscreen?

10 In problem 8, to get a metre of cloth Jane is willing to give up 1.5 kilograms of corn if she has 2 metres of cloth, 1 kilogram of corn if she has 4 metres of cloth, and 0.5 kilograms of corn is she has 6 metres of cloth.

a Draw a graph of Jane's marginal benefit from cloth.

b What is Jane's efficient quantity of cloth?

***11** Busyland's production possibilities are:

Food (kilograms per month)		Sunscreen (litres per month)
150	and	0
100	and	100
50	and	200
0	and	300

Calculate Busyland's opportunity costs of food and sunscreen at each output in the table.

12 Joe's Island's production possibilities are:

Corn (kilograms per month)		Cloth (metres per month)
6	and	0
4	and	1
2	and	2
0	and	3

Calculate Joe's opportunity costs of producing corn and cloth at each output in the table.

***13** In problems 7 and 11, Leisureland and Busyland each produce and consume 100 pounds of food and 100 gallons of sunscreen per month, and they do not trade. Now the countries begin to trade with each other.

a What good does Leisureland sell to Busyland and what good does it buy from Busyland?

b If Leisureland and Busyland divide the total output of food and sunscreen equally, what are the gains from trade?

14 In problems 8 and 12, Jane's Island and Joe's Island each produce and consume 4 pounds of corn and 2 yards of cloth and they do not trade. Now the islands begin to trade.

a What good does Jane sell to Joe and what good does Jane buy from Joe?

b If Jane and Joe divide the total output of corn and cloth equally, what are the gains from trade?

Critical Thinking

1 Study *Reading Between the Lines* news article about student choices on pp. 46–47 and answer the following questions:

a Why is the *PPF* for education goods and services and consumption goods and services bowed outward?

b At what point on the blue *PPF* in Figure 1 on p. 47, is the combination of education goods and services and consumption goods and services efficient?

c Students are facing rising tuition fees. Does this make the opportunity cost of education increase, decrease, or remain unchanged?

Web Exercise

Use the links on *Parkin Interactive* to work the following exercise.

1 Read about the costs to working mothers and the female poverty trap and then answer the following questions:

a Why have the opportunity costs to working mothers fallen over time,

b Why are the opportunity costs lower for highly educated women?

Part 2
How Markets Work

The Amazing Market

The four chapters that you will study in this part explain how markets work. A market is an amazing instrument. It enables people who have never met and who know nothing about each other to interact and do business. It also enables us to allocate our scarce resources to the uses that we value most highly.

You will begin in Chapter 3 by learning about the laws of demand and supply. You will discover the forces that make prices adjust to coordinate buying plans and selling plans. In Chapter 4, you will learn how to calculate, interpret and use the concept of elasticity to predict how prices and quantities respond to the forces that operate in markets to change demand and supply. In Chapter 5, you will discover the conditions under which a competitive market sends resources to their most highly valued uses. And finally, in Chapter 6, you will learn what happens when governments intervene in markets to fix minimum or maximum prices, impose taxes or quotas, or make some goods illegal.

All businesses operate in markets and success in business requires a thorough understanding of market forces.