Chapter 1
The foundations of economics

This chapter is an introduction to the study of economics. It is also an introduction to many topics that will be explored in depth in later chapters.

1.1 Scarcity, choice and opportunity cost

The fundamental problem of economics: scarcity and choice

The problem of scarcity

- Explain that scarcity exists because factors of production are finite and wants are infinite.

The term 'economics' is derived from the ancient Greek expression οἶκον νέμειν (*oikon nemein*), which originally meant 'one who manages and administers all matters relating to a household'. Over time, this expression evolved to mean 'one who is prudent in the use of resources'. By extension, economics has come to refer to the careful management of society's scarce resources to avoid waste. Let's examine this idea more carefully.

Human beings have very many needs and wants. Some of these are satisfied by physical objects and others by non-physical activities. All the physical objects people need and want are called *goods* (food, clothing, houses, books, computers, cars, televisions, refrigerators, and so on); the non-physical activities are called *services* (education, health care, entertainment, travel, banking, insurance and many more).

The study of economics arises because people's needs and wants are unlimited, or infinite. Whereas some individuals may be satisfied with the goods and services they have or can buy, most would prefer to have more. They would like to have more and better computers, cars, educational services, transport services, housing, recreation, travel, and so on; the list is endless.

Yet it is not possible for societies and the people within them to produce or buy all the things they want. Why is this so? It is because there are not enough **resources**. Resources are the inputs used to produce goods and services wanted by people, and for this reason are also known as **factors of production**. They include things like human labour, machines and factories, and 'gifts of nature' like agricultural land and metals inside the earth. Factors of production do not exist in unlimited abundance: they are *scarce*, or limited and insufficient in relation to unlimited uses that people have for them.

Scarcity is a very important concept in economics. It arises whenever there is not enough of something in relation to the need for it. For example, we could say that food is scarce in poor countries, or we could say that clean air is scarce in a polluted city. In economics, scarcity is especially important in describing a situation of *insufficient factors of production*, because this in turn leads to insufficient goods and services. Defining scarcity, we can therefore say that:

Scarcity is the situation in which available resources, or factors of production, are finite, whereas wants are infinite. There are not enough resources to produce everything that human beings need and want.

Why scarcity forces choices to be made

- Explain that as a result of scarcity, choices have to be made.

The conflict between unlimited wants and scarce resources has an important consequence. Since

people cannot have everything they want, they must make *choices*. The classic example of a choice forced on society by resource scarcity is that of 'guns or butter', or more realistically the choice between producing defence goods (guns, weapons, tanks) or food: more defence goods mean less food, while more food means fewer defence goods. Societies must choose how much of each they want to have. Note that if there were no resource scarcity, a choice would not be necessary, since society could produce as much of each as was desired. But resource scarcity forces the society to make a choice between available alternatives. Economics is therefore a study of choices.

The conflict between unlimited needs and wants, and scarce resources has a second important consequence. Since resources are scarce, it is important to avoid waste in how they are used. If resources are not used effectively and are wasted, they will end up producing less; or they may end up producing goods and services that people do not really want or need. Economics must try to find how best to use scarce resources so that waste can be avoided. Defining economics, we can therefore say that:

Economics is the study of choices leading to the best possible use of scarce resources in order to best satisfy unlimited human needs and wants.

As you can see from this definition of economics, economists study the world from a social perspective, with the objective of determining what is in society's best interests.

Test your understanding 1.1

1. Think of some of your most important needs and wants, and then explain whether these are satisfied by goods or by services.
2. Why is economics a study of choices?
3. Explain the relationship between scarcity and the need to avoid waste in the use of resources.
4. Explain why diamonds are far more expensive than water, even though diamonds are a luxury while water is a necessity without which we cannot live.

Three basic economic questions: resource allocation and output/income distribution

- Explain that the three basic economic questions that must be answered by any economic system are: 'What to produce?', 'How to produce?' and 'For whom to produce?'
- Explain that economics studies the ways in which resources are allocated to meet needs and wants.

Scarcity forces every economy in the world, regardless of its form of organisation, to answer three basic questions:

- **What to produce.** All economies must choose what particular goods and services and what quantities of these they wish to produce.
- **How to produce.** All economies must make choices on how to use their resources in order to produce goods and services. Goods and services can be produced by use of different combinations of factors of production (for example, relatively more human labour with fewer machines, or relatively more machines with less labour), by using different skill levels of labour, and by using different technologies.
- **For whom to produce.** All economies must make choices about how the goods and services produced are to be distributed among the population. Should everyone get an equal amount of these? Should some people get more than others? Should some goods and services (such as education and health care services) be distributed more equally?

The first two of these questions, *what to produce* and *how to produce*, are about *resource allocation*, while the third, *for whom to produce*, is about the *distribution of output and income*.

Resource allocation refers to assigning available resources, or factors of production, to specific uses chosen among many possible alternatives, and involves answering the *what to produce* and *how to produce* questions. For example, if a *what to produce* choice involves choosing a certain amount of food and a certain amount of weapons, this means a decision is made to *allocate* some resources to the production of food and some to the production of weapons. At the same time, a choice must be made about *how to produce*: which particular factors of production and in what quantities (for example, how much labour, how many machines, what types of machines, etc.) should be assigned to produce food, and which and how many to produce weapons.

If a decision is made to change the amounts of goods produced, such as more food and fewer weapons, this involves a **reallocation** of resources. Sometimes, societies produce the 'wrong' amounts of goods and services relative to what is socially desirable. For example, if too many weapons are being produced, we say there is an **overallocation** of resources in production of weapons. If too few socially desirable goods or services are being produced, such as education or health care, we say there is an **underallocation** of resources to the production of these.

An important part of economics is the study of how to allocate scarce resources, in other words how to assign resources to answer the *what to produce* and *how to produce* questions, in order to meet human needs and wants in the best possible way.

The third basic economic question, for *whom to produce*, involves the *distribution of output* and is concerned with how much output different individuals or different groups in the population receive. This question is also concerned with the **distribution of income** among individuals and groups in a population, since the amount of output people can get depends on how much of it they can buy, which in turn depends on the amount of income they have. When the distribution of income or output changes so that different social groups now receive more, or less, income and output than previously, this is referred to as **redistribution of income**.

Test your understanding 1.2

1 What are the three basic economic questions that must be addressed by any economy?

2 Explain the relationship between the three basic economic questions, and the allocation of resources and the distribution of income or output.

3 Consider the following, and identify each one as referring to output/income distribution or redistribution; or to resource allocation, reallocation, overallocation or underallocation (note that there may be more than one answer).

(a) Evidence suggests that over the last two decades in many countries around the world the rich are getting richer and the poor are getting poorer.

(b) In Brazil, the richest 10% of the population receive 48% of total income.

(c) Whereas rich countries typically spend 8–12% of their income on providing health care services to their populations, many poor countries spend as little as 2–3% of income.

(d) Many developing countries devote a large proportion of their government budget funds for education to spending on university level education, while large parts of their population remain illiterate.

(e) If countries around the world spent less on defence, they would be in a position to expand provision of social services, including health care and education.

(f) Pharmaceutical companies spend most of their research funds on developing medicines to treat diseases common in rich countries, while ignoring the treatment of diseases common in poor countries.

Resources as factors of production

We have seen that resources, or all inputs used to produce goods and services, are also known as factors of production.

The four factors of production

Economists group factors of production under four broad categories:

- **Land** includes all natural resources, including all agricultural and non-agricultural land, as well as everything that is under or above the land, such as minerals, oil reserves, underground water, forests, rivers and lakes. Natural resources are also called 'gifts of nature'.
- **Labour** includes the physical and mental effort that people contribute to the production of goods and services. The efforts of a teacher, a construction worker, an economist, a doctor, a taxi driver or a plumber all contribute to producing goods and services, and are all examples of labour.
- **Capital**, also known as *physical capital*, is a man-made factor of production (it is itself produced) used to produce goods and services. Examples of physical capital include machinery, tools, factories, buildings, road systems, airports, harbours, electricity generators and telephone supply lines. Physical capital is also referred to as a capital good or investment good.

- **Entrepreneurship** (management) is a special human skill possessed by some people, involving the ability to innovate by developing new ways of doing things, to take business risks and to seek new opportunities for opening and running a business. Entrepreneurship organises the other three factors of production and takes on the risks of success or failure of a business.

Other meanings of the term 'capital'

The term 'capital', in a most general sense, refers to resources that can produce a future stream of benefits. Thinking of capital along these lines, we can understand why this term has a variety of different uses, which although are seemingly unrelated, in fact all stem from this basic meaning.

- **Physical capital**, defined above, is one of the four factors of production consisting of man-made inputs that provide a stream of future benefits in the form of the ability to produce greater quantities of output: physical capital is used to produce more goods and services in the future.
- **Human capital** refers to the skills, abilities and knowledge acquired by people, as well as good levels of health, all of which make them more productive. Human capital provides a stream of future benefits because it increases the amount of output that can be produced in the future by people who embody skills, education and good health.
- **Natural capital**, also known as *environmental capital*, refers to an expanded meaning of the factor of production 'land' (defined above). It includes everything that is included in land, plus additional natural resources that occur naturally in the environment such as the air, biodiversity, soil quality, the ozone layer, and the global climate. Natural capital provides a stream of future benefits because it is necessary to humankind's ability to live, survive and produce in the future.
- **Financial capital** refers to investments in financial instruments, like stocks and bonds, or the funds (money) that are used to buy financial instruments like stocks and bonds. Financial capital also provides a stream of future benefits, which take the form of an income for the holders, or owners, of the financial instruments.

Test your understanding 1.3

1 **(a)** Why are resources also called 'factors of production'? **(b)** What are the factors of production?

2 How does physical capital differ from the other three factors of production?

3 Why is entrepreneurship considered to be a factor of production separate from labour?

4 **(a)** What are the various meanings of the term 'capital'? **(b)** What do they all have in common?

Scarcity, choice and opportunity cost: the economic perspective

- Explain that when an economic choice is made, an alternative is always foregone.

Opportunity cost

Opportunity cost is defined as the value of the next best alternative that must be given up or sacrificed in order to obtain something else.

When a consumer chooses to use her $100 to buy a pair of shoes, she is also choosing not to use this money to buy books, or CDs, or anything else; if CDs are her favourite alternative to shoes, the CDs she sacrificed (did not buy) are the opportunity cost of the shoes. When a business chooses to use its resources to produce hamburgers, it is also choosing not to produce hotdogs or pizzas, or anything else; if hotdogs are the preferred alternative, the hotdogs sacrificed (not produced) are the opportunity cost of the hamburgers. Note that if the consumer had endless amounts of money, she could buy everything she wanted and the shoes would have no opportunity cost. Similarly, if the business had endless resources, it could produce hotdogs, pizzas and a lot of other things in addition to hamburgers, and the hamburgers would have no opportunity cost. If resources were limitless, no sacrifices would be necessary, and the opportunity cost of producing anything would be zero.

The concept of **opportunity cost**, or the value of the next best alternative that must be sacrificed to obtain something else, is central to the economic perspective of the world, and results from scarcity that forces choices to be made.

Test your understanding 1.4

1 Explain the relationship between scarcity and choice.

2 Define opportunity cost.

3 Think of three choices you have made today, and describe the opportunity cost of each one.

The production possibilities model

- Explain that a production possibilities curve (production possibilities frontier) model may be used to show the concepts of scarcity, choice, opportunity cost and a situation of unemployed resources and inefficiency.

The production possibilities model is a simple model of the economy illustrating some important concepts.

Introducing the production possibilities curve

Consider a simple hypothetical economy producing only two goods: microwave ovens and computers. This economy has a fixed (unchanging) quantity and quality of resources (factors of production) and a fixed technology (the method of production is unchanging). Table 1.1 shows the combinations of the two goods this economy can produce. Figure 1.1 plots the data of Table 1.1: the quantity of microwave ovens is plotted on the vertical axis, and the quantity of computers on the horizontal axis.

If all the economy's resources are used to produce microwave ovens, the economy will produce 40 microwave ovens and 0 computers, shown by point A. If all resources are used to produce computers, the economy will produce 33 computers and 0 microwave ovens; this is point E. All the points on the curve joining A and E represent other production possibilities where some of the resources are used to produce microwave ovens and the rest to produce computers. For example, at point B there would be production of 35 microwave ovens and 17 computers; at point C, 26 microwave ovens and 25 computers, and so on. The line joining

Point	Microwave ovens	Computers
A	40	0
B	35	17
C	26	25
D	15	31
E	0	33

Table 1.1 Combinations of microwave ovens and computers

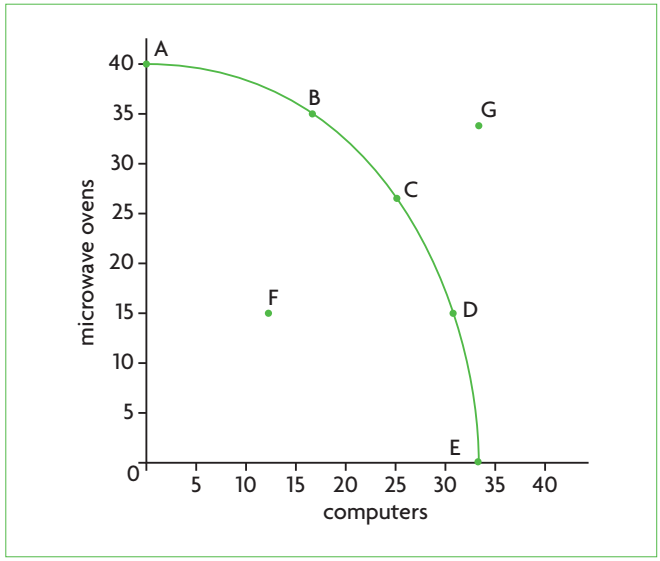

Figure 1.1 Production possibilities curve

points A and E is known as the production possibilities curve (*PPC*) or production possibilities frontier (*PPF*).

In order for the economy to produce the greatest possible output, in other words somewhere on the *PPC*, two conditions must be met:

- **All resources must be fully employed.** This means that all resources are being fully used. If there were unemployment of some resources, in which case they would be sitting unused, the economy would not be producing the maximum it can produce.
- **All resources must be used efficiently.** Specifically, there must be **productive efficiency**. The term 'efficiency' in a general sense means that resources are being used in the best possible way to avoid waste. (If they are not used in the best possible way, we say there is 'inefficiency'.) Productive efficiency means that output is produced by use of the fewest possible resources; alternatively, we can say that output is produced at the lowest possible cost. If output were not produced using the fewest possible resources, the economy would be 'wasting' some resources.

The **production possibilities curve (or frontier)** represents all combinations of the maximum amounts of two goods that can be produced by an economy, given its resources and technology, when there is full employment of resources and productive efficiency. All points on the curve known as **production possibilities**.

What would happen if either of the two conditions (full employment and productive efficiency) is not met? Very simply, the economy will not produce at a

point on the *PPC*; it will be somewhere inside the *PPC*, such as at point F. At F, the economy is producing only 15 microwave ovens and 12 computers, indicating that there is either unemployment of resources, or productive inefficiency, or both. If this economy could use its resources fully and efficiently, it could, for example, move to point C and produce 26 microwave ovens and 25 computers.

However, in the real world no economy is ever likely to produce on its *PPC*.

An economy's **actual output**, or the quantity of output actually produced, is always at a point inside the *PPC*, because in the real world all economies have some unemployment of resources and some productive inefficiency. The greater the unemployment or the productive inefficiency, the further away is the point of production from the *PPC*.

The production possibilities curve and scarcity, choice and opportunity cost

The production possibilities model is very useful for illustrating the concepts of scarcity, choice and opportunity cost:

- **The condition of scarcity does not allow the economy to produce outside its PPC.** With its fixed quantity and quality of resources and technology, the economy cannot move to any point outside the *PPC*, such as G, because it does not have enough resources (there is resource scarcity).
- **The condition of scarcity forces the economy to make a choice about what particular combination of goods it wishes to produce.** Assuming it could achieve full employment and productive efficiency, it must decide at which particular point on the *PPC* it wishes to produce. (In the real world, the choice would involve a point inside the *PPC*.)
- **The condition of scarcity means that choices involve opportunity costs.** If the economy were at any point on the curve, it would be impossible to increase the quantity produced of one good without decreasing the quantity produced of the other good. In other words, when an economy increases its production of one good, there must necessarily be a sacrifice of some quantity of the other good; this sacrifice is the opportunity cost.

Let's consider the last point more carefully. Say the economy is at point C, producing 26 microwave ovens and 25 computers. Suppose now that consumers would like to have more computers. It is impossible to produce more computers without sacrificing production of some microwave ovens. For example, a choice to produce 31 computers (a move from C to D) involves a decrease in microwave oven production from 26 to 15 units, or a sacrifice of 11 microwave ovens. The sacrifice of 11 microwave ovens is the opportunity cost of 6 extra computers (increasing the number of computers from 25 to 31). Note that opportunity cost arises when the economy is on the *PPC* (or more realistically, somewhere close to the *PPC*). If the economy is at a point inside the curve, it can increase production of both goods with no sacrifice, hence no opportunity cost, simply by making better use of its resources: reducing unemployment or increasing productive efficiency.

The shape of the production possibilities curve

In Figure 1.2(a) the *PPC*'s shape is similar to that of Figure 1.1, while in Figure 1.2(b) it is a straight line. When the *PPC* bends outward and to the right, as in Figure 1.2(a), opportunity costs change as the economy moves from one point on the *PPC* to another. In part (a),

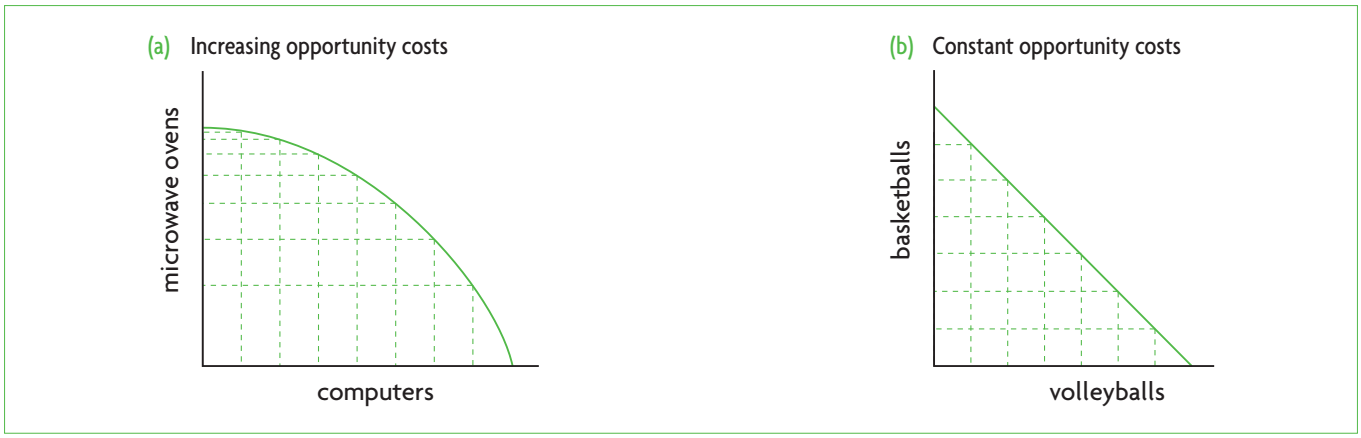

Figure 1.2 Production possibilities curve with increasing and constant opportunity costs

for each additional unit of computers that is produced, the opportunity cost, consisting of microwave ovens sacrificed, gets larger and larger as computer production increases. This happens because of specialisation of factors of production, which makes them not equally suitable for the production of different goods and services. As production switches from microwave ovens to more computers, it is necessary to give up increasingly more microwave ovens for each extra unit of computers produced, because factors of production suited to microwave oven production will be less suited to computer production. By contrast, when the *PPC* is a straight line (as in Figure 1.2(b)), opportunity costs are constant (do not change) as the economy moves from one point of the *PPC* to another. Constant opportunity costs arise when the factors of production are equally well suited to the production of both goods, such as in the case of basketballs and volleyballs, which are very similar to each other, therefore needing similarly specialised factors of production to produce them. As we can see in Figure 1.2(b), for each additional unit of volleyballs produced, the opportunity cost, or sacrifice of basketballs, does not change.

Test your understanding 1.5

1 Consider the production possibilities data in Table 1.1 and Figure 1.1. If the economy is initially at point A and moves to point B, computer production will increase by 17 units. **(a)** What is the opportunity cost of the increase in computer production? **(b)** If the economy moves from D to C, what will be the gain and what will be its opportunity cost? **(c)** If it moves from point C to B, what will be the gain and what will be its opportunity cost?

2 Use the concept of opportunity cost to explain why the following two statements have the same meaning: **(a)** productive efficiency means producing by use of the fewest possible resources, and **(b)** productive efficiency means producing at the lowest possible cost.

3 **(a)** Distinguish between output actually produced and output on the *PPC*. **(b)** Why is an economy's actual output most likely to be located somewhere inside its *PPC*?

4 Say an economy is initially at point F, producing 15 microwave ovens and 12 computers (Figure 1.1). What would be the opportunity cost of moving to a point on the production possibilities curve, such as point C, where it would be producing 26 microwave ovens and 25 computers?

1.2 Economics as a social science

The nature and method of economics

Economics as a social science

- Explain that economics is a social science.

The **social sciences** are academic disciplines that study human society and social relationships. They are concerned with discovering general principles describing how societies function and are organised. The social sciences include anthropology, economics, political science, psychology, sociology and others.

Economics is a *social* science because it deals with human society and behaviour, and particularly those aspects concerned with how people organise their activities and how they behave to satisfy their needs and wants. It is a social *science* because its approach to studying human society is based on the social scientific method.

The social scientific method

- Outline the social scientific method.

As a social science, economics tries to explain in a systematic way why economic events happen the way they do, and attempts to predict economic events likely to occur in the future. To accomplish all this, economists use the **social scientific method**. This is the same as the scientific method, which you may already be familiar with through your studies of one or more of the natural sciences (for example, biology, chemistry, and physics). It is a method of investigation used in all the social and natural sciences, allowing us to acquire knowledge of the world around us.

The social scientific (or scientific) method consists of the following steps:

Step 1: Make observations of the world around us, and select an economic question we want to answer. Let's consider an example from economics. We observe that people living in the city of Olemoo buy different amounts of oranges per week at different times in the year. We want to answer the question: why are more oranges bought in some weeks and fewer in others?

Step 2: Identify variables we think are important to answer the question. A variable is any measure that can take on different values, such as temperature, or weight, or distance. In our example the variables we choose to study are the