Simplified Principles of Microeconomics

Hazbo Skoko

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1st edition
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ISBN 978-87-403-0993-5
Peer reviewed by Prof. Tim Brook PhD (math.) and Elvira Skoko MSc (Psy.)

Contents

Dedicated to Ella Sirka and Rafael Goran Skoko

Introduction

Several years ago a student rushed into my office without any consideration for my work or for the thoughts I had at the time. 'Professor I hate economics, I don't know anything about it. I have to take it for my degree and I'm scared'. She sat down on a chair and started sobbing helplessly.

Economic subjects are often regarded as 'hard, mathematical, full of formulas, dry and boring'. These are some of the descriptions you often hear when you ask students how they first perceive economic subjects.

Economics class sizes are shrinking at most universities, and at some universities they have been abandoned altogether. If there are some economics subjects left in business colleges, the curriculum is adjusted to 'please the students' rather than to teach them about an important aspect of their daily lives.

Why are economics subjects attracting such negative responses from students? Where is the problem? Is it really so hard to comprehend 'those two lines', the two different shapes on a graph, the famous demand and supply curves that can be used to explain almost everything in economics?

This book proposes straightforward answers to these questions based on the way the subject is presented. The principles of economic theory have to be explained in terms of everyday activities. Everyday activities are, after all, what economics is all about! Yes, every day we use complicated economic laws without even noticing.

This book aims to deal with these problems instead of changing the curriculum in an attempt to please the students. It uses a teaching method that has been proved to work all over the world. Economics is presented in simplified terms with real-life examples. In a few short chapters I shall explain the most important principles of microeconomics in the simplest possible terms.

I have taught economics for more than two decades all over the world. In each country, with its distinct culture, customs and languages, my teaching philosophy has been the same: use simplicity, honesty, humour and show respect for differences in the learning styles of students. As the result of this approach, I have received accolades from students and heard many inspirational stories.

Finally, here is one real-life example of my teaching approach. It can be described, in a nutshell, as presenting a concept in simple real-life terms, getting students to understand it, then leaving further applications for them to think about.

At one university I teach entrepreneurship as part of the economics syllabus. I was asked to talk about creativity. This is how the class went:

Before the start of class, I had set the scene by placing objects around the room. There were balls, pieces of paper, paints, a saxophone, bottles: whatever I had been able to bring from my home. These objects would have appeared to be strategically placed but in fact they were in no particular order. The students seemed puzzled at the scene but they were making no comments when I entered the room. I introduced myself, then sat quietly at the desk apparently minding my own business, reading and making notes. During this time I was actually taking notes on what was happening in the class.

During the first five minutes, the students were quiet, a bit confused about what was happening, expecting at every moment that I would start telling them how to be creative.

During the next ten minutes, the students began to give up on me. They started texting under the desk, writing notes or checking their schedule for the next class. Overall they remained well behaved.

During the rest of the time, the students found things to do with the objects that were scattered around the room. A few were painting; some sketched; a few were making paper planes, cutting coloured paper and gluing; some tried to play the saxophone; one student drew cartoon characters. In short, the students did whatever they liked, paying no attention to my presence whatsoever.

At the end of the class I stood up and said 'Thank you very much for your work. That was our class on creativity.' The students turned around, putting aside whatever they were doing, and applauded.

Later, of course, I spoke to them about practicalities, but not about creativity itself. (How could you teach anyone to be creative or to think?) Instead, I gave the students practical strategies to enable alternative thinking, to make themselves ready for an epiphany, to use technology, to follow their dreams, to establish a business and to employ people. Finally, I spoke to them about the five basic principles of economics to apply when establishing and running a business: the five principles discussed in this book.

Part 1

1 The structure of this book

This book is divided into three parts. Part 1 is the foundation for the main body of the book. It provides the visual vocabulary for the rest of the book. Part 2 is the core of the book. It deals with five essential principles of microeconomics. Part 3 contains a summary and the reference material.

Part 1

The chapter 'Those two lines' explains a few basic concepts and how they are portrayed with one or two lines on a graph.

Part 2

The first chapter in Part 2 discusses The First Principle: the economic fact of life that 'we can't have everything we want'. The next chapter, The Second Principle, deals with desires and availability, the economics of demand and supply. In the chapter on The Third Principle you will learn how to measure how our desires respond to changes in prices. The Fourth Principle will take you to the marketplace where those who want a product or service negotiate with those who produce or provide it. The final chapter on The Fifth Principle examines the types of costs we have to pay to produce something.

In each chapter I first list the objectives of that chapter and what you will get out of it. Then I discuss the topic in simple terms, providing real-life examples. I also include exercises or questions you will need to increase your understanding of the topic.

These few chapters will enable you to understand the basics of economics. They will provide a solid foundation for further studies in economics if you ever need to take a more comprehensive course.

Part 3

Part 3 contains some handy reference material: the bibliography is a list of useful textbooks; the answers allow you to check your work after you have attempted the exercises in the text; the glossary explains some words that are frequently used in economics.

2 How to read this book

Start by studying 'Those two lines' in the first chapter. Do not worry at this stage if there is something that does not make sense to you. Everything will become clearer as you study the five basic principles in Part 2 of the book. From time to time, as you progress through the rest of the book, come back to review the chapter on 'Those two lines'.

Throughout the book I suggest various activities for you to try. Be sure to make an honest attempt at each of these activities. Write down your answers, then compare your written answers with the answers at the end of the book.

You will find many new words and phrases in this book, and also words and phrases that have special meanings in economics. I shall give you an careful explanation of each of these terms as it arises. Do not worry if you cannot remember everything the first time. On the other hand, if you are not sure of the meaning of a term, do not ignore it: check in the glossary at the end of this book, look it up in a dictionary or search for it on line.

In some chapters I shall expand the discussion to round out the topic and perhaps also satisfy your curiosity. These extra sections are indicated by |**a border around the text**|. You may chose to skip the extra sections and focus only on the main body of the chapter. You will be equipped to study the later chapters, even without the extra material.

3 Those two lines

3.1 Learning Objectives

After studying this chapter you will know

- how economists present many concepts using a single graph
- how the different directions of the lines on the graph explain different relationships
- how to draw a graph from a set of data.

As I mentioned in the introduction, economics is about everyday activities. Everything in life has two sides to it, so too everything in economics has two sides: black-white, increase-decrease, birth-death, together-separate, head-tail and so on.

Most concepts in economics can be represented by one or two lines. Economists are both rational and practical people so these lines are very useful tools for explaining certain relationships.

Consider an example. Picture a marketplace where a seller and a buyer are negotiating. For example, you could picture a vendor at a fruit market who has apples and a customer who wants to buy apples. Instead of just talking about prices and quantities, economists draw two intersecting lines. These lines represent the relationship between price and quantity. They are drawn in the area bordered by two axes.

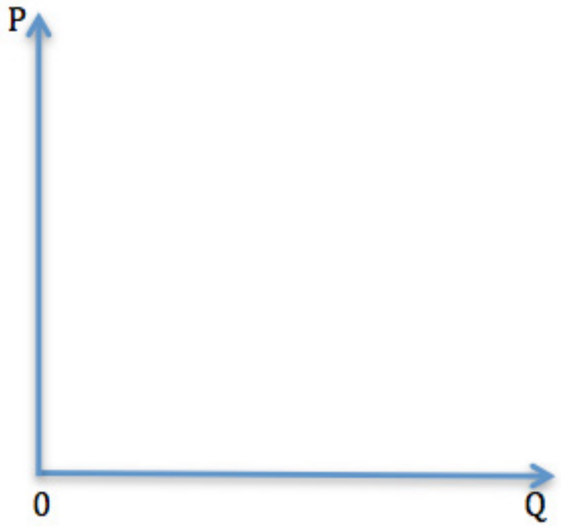


Figure 1

Economists use the convention that quantity, *Q*, is presented on the horizontal axis and price, *P*, is presented on the vertical axis. Quantities are shown in an appropriate unit such as kilograms for apples. Prices are shown in monetary units, for example dollars, pounds or euros.

The point of intersection of these lines is called the *equilibrium point*. This is where the quantity demanded is equal to the quantity supplied.

I want to show how a change in the price of apples corresponds to a change in the quantity of the apples the customer is willing to buy, so I need some data. Table 1 lists imaginary price and quantity data for the customer.

Quantities in kg *Q*	**Prices** in $ *P*
1	6
2	5
3	4
4	3
5	2
6	1

Table 1

I can now mark these numbers on the axes and connect related numbers: Q=1 & P=6; Q =2 & P=5; and so on. In doing so I draw the **black** line showing the relationship between price and quantity.

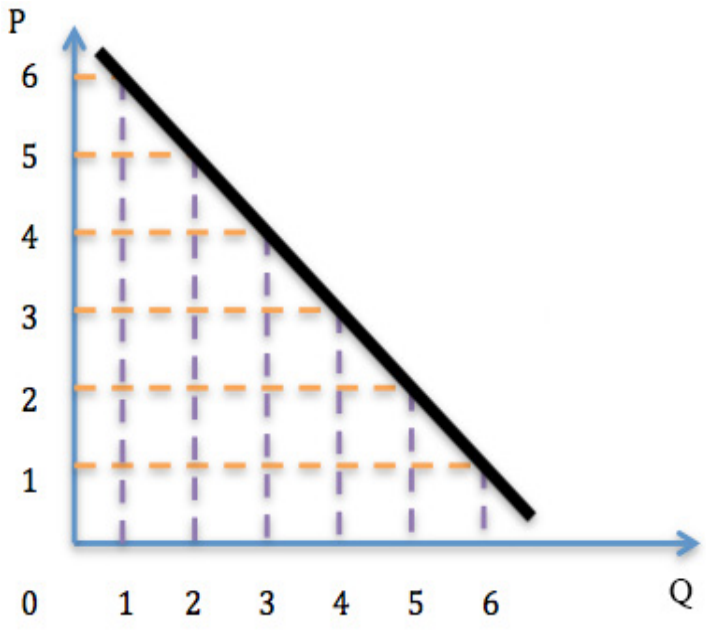


Figure 2

When there is a decrease in the price of apples, there is increase in the quantity the customer will buy. The variables price and quantity go in opposite directions, as one increases the other decreases, so their relationship is called an *inverse relationship* or a *negative relationship*. I use these terms interchangeably. (In other books, you may also see the terms *opposite relationship* and *indirect relationship*.)

A defining characteristic of economics is that it is a scientific study of the behaviour of a typical, rational person. The **black** line shows how such a person behaves. When **the price of a product decreases** they buy more of it, **the quantity demanded increases**. Such a line in economics is called a *demand curve*. It does not have to be a straight line, as it is in Figure 2; it could be a curved or broken shape, as you will see when you get to Your Turn at the end of this chapter.

Until now I have been talking about the behaviour of people who want a product or service and their willingness to pay a certain price for a certain quantity, the **relationship between price and quantity**. Furthermore, I have illustrated the inverse relationship with the **black** line in Figure 2: it is going downwards; a customer is willing to buy more when the price is lower.

Remember, in economics you always have to consider two sides to any argument. So now, instead of thinking about the customer's point of view, consider the seller of a product or service. Imagine yourself as a seller. How would you react to a change in price? Yes, exactly the opposite: the higher the price, the more you are willing to sell and, *vice versa*, the lower the price the less you are willing to sell.

Reminder

We can present everything in economics by a line or two on a graph.

The line for the seller will look different from the line for the customer. The new line will show the opposite behaviour of a seller. Again I need some imaginary data, which I shall plot on another graph.

Quantities in kg *Q*	**Prices** in $ *P*
0	0
1	1
2	2
3	3
4	4
5	5
6	6

Table 2

From Table 2, you can see how a seller is happier when prices increase and is willing to sell more of the product with each increase in price.

Again I take the numbers from the table and mark them on the axes. Then I connect related numbers: Q=1 & P=1; Q=2 & P=2; and so on. In doing so I draw the **blue** line in Figure 3 showing the relationship between price and quantity.

When the price of a product is increased, the quantity supplied is increased. Since the variables price and quantity are going in same direction, such a relationship is called a *direct relationship* or a *positive relationship*.

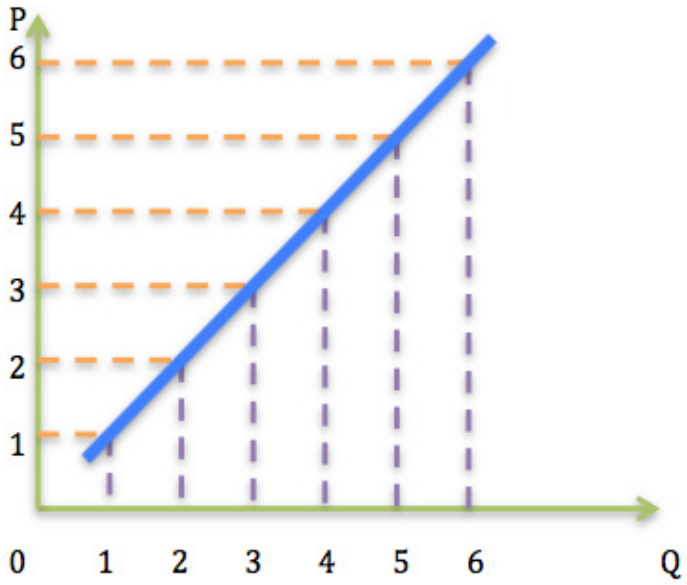


Figure 3

The **blue** line in Figure 3 shows how sellers behave. When **the price of a product increases** they offer more of the product for sale, **the quantity supplied increases**. Such a line in economics is called a *supply curve*. It does not have to be a straight line; it could be a curved or broken shape, as you will see when you do the exercises at the end of this chapter.

That completes the story about the **black** and **blue** lines and how you can draw them to illustrate the behaviour of customers and suppliers. It completes the first stage of your journey towards an understanding of S*implified principles of microeconomics.*

Now it is time for you to do a few exercises and answer a few questions to increase your understanding of the topics I have covered so far.

Your Turn

Draw the graph based on these numbers:

Prices in $ *P*	**Quantities** in kg *Q*
2	3
3	5.5
4	6.5
6	7.5
9	8

Questions

1. Explain in your own words what economics is about.
2. Which type of relationship does the **black** line in Figure 2 represent?
3. What does *vice versa* mean? And why am I asking this question in book about economics?
4. Look carefully at these diagrams:

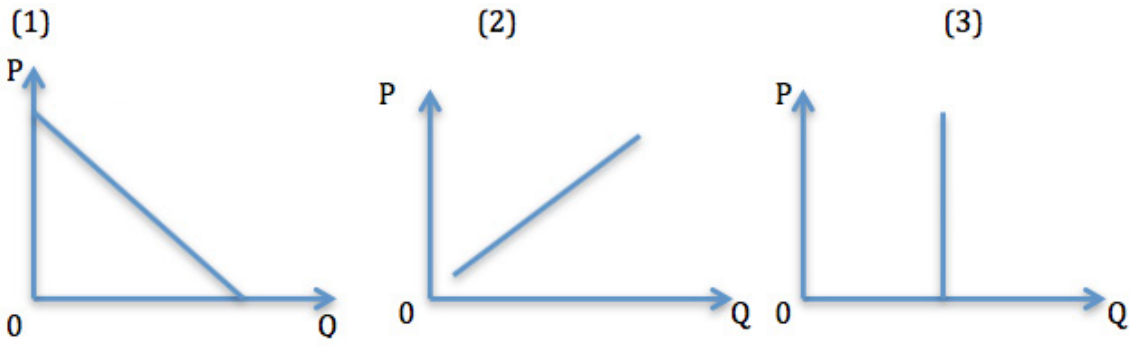


Figure 4

a) Which of these graphs[1] shows a negative relationship?
b) Which of these figures show a quantity that remains unchanged even when the price changes?
c) In which of these diagrams is the *Q*-*P* relationship positive rather then negative?

Exercise

Choose a product that is on sale at your local supermarket or on a website. Collect data about the prices and quantities of this product. Draw a graph depicting their relationship.

Tips

- When you use graphs, always label them properly. Give each graph a title and label the axes appropriately.
  Interpreting a graph without labels is like trying to find a can of beans on a shelf full of unlabelled cans.
- Reading a graph should be as easy as reading text.
- Plotting a point on a graph is a straightforward process. Starting from 0 on each axis, find the point on the axis that corresponds to the given value, then follow straight lines from each of these points into the space bordered by the axes until the lines meet.

  For example, to find the point where Q=5 & P=7: on the Q axis find 5; on P axis find 7; imagine a straight line going vertically from 5 on Q; imagine a straight line going horizontally from 7 on P; find the point where these two lines meet.

Further reading

Look up one of the books in the bibliography or find any substantial economics textbook. You are sure to find a chapter on graphs near the beginning of the book.

There are millions of websites dealing with graphs in economics. Search for 'graphs in economics' and follow some of the links.

Part 2

4 The First Principle: we can't have everything we want

4.1 Learning objectives

After studying this chapter you will be able to

- use one of the most important concepts in economics: **opportunity costs**
- recognise the **opportunity costs** of your actions
- illustrate **opportunity costs** on a graph

Why can't we have everything that we want? The answer to this question is very simple: there are **not enough resources to satisfy everyone's desires**. In other words, **human desires may be unlimited but resources are not.**

This is a fact of life. There are not enough resources for everybody to have everything they want; **we have to make trade-offs**. That is, we usually have to make some **sacrifices** and choose one thing over another. For example, I would like to have a small car for around the city and another car for long distances, but I cannot afford two cars. Which one should I choose? Well, most of the time I use my car to travel around town. Therefore I will choose a small town car and do without a bigger car that would have been more convenient for long distances.

You have probably experienced numerous situations where you had to choose one product or one service over another. Perhaps you chose an iPhone instead of a Samsung, or an exotic holiday instead of deposit for a house, or one perfume instead of another, or you put money into a savings account to earn interest instead of investing it in a business venture. I am sure you can think of lots of examples.

When you think like an economists, you make choices by considering both the costs and benefits of each action, and then you chose the alternative that leaves you better off. You will always make sure that the benefits of your choice are greater than costs. For example, if a shop 10 km away is offering a discount on the new iPad, you may decide not to buy one at a local shop after you have worked out that the cost of travelling 20 km is less than the discount. But there is a catch! When you choose one product over another, you face not only the obvious, direct cost of that choice but also an indirect cost, the value of the missed opportunity.

When you choose one product over another, along with the price of that product, you also incur the costs of missing out on the product you sacrificed. For example, if I choose to invest my money in property instead of depositing it in the bank to earn interest, apart from the price of that property, I also incurred the cost of the lost interest. And, *vice versa,* if I deposit money in a bank instead of buying a property, the costs of earning the interest would be the missing value of having a property in my portfolio. Another example would be if I have chosen an iPhone over a Samsung smart phone, the cost of having an iPhone includes the missing value of having a Samsung smart phone.

So, when you choose one thing instead of something else, you effectively incur costs which can be expressed as the value of the missed opportunity, the value you would have had if you had chosen the alternative. These costs are called *opportunity costs*. They may also be called *implicit costs* in contrast to the **out of pocket expenses,** the **tangible** costs, which are called *explicit costs*.

Opportunity costs are unique to economics. By contrast, an accountant will only recognise explicit costs.

More examples:

- Suppose I choose to buy a PC for $800. The opportunity costs of having the PC is the value of something else I could have used the $800 for. If the second best choice was to deposit $800 in a savings account, the opportunity costs of the PC would be the interest I would have earned on the $800 but did not.
  - If I was not writing this chapter, I would be spending time with my family. The opportunity costs of writing this chapter is the time with my family that I have sacrificed.
  - If I had wanted to sleep in this morning, the opportunity costs of writing this chapter would have been an hour or two of missed sleep.

In short, **every choice in life has opportunity costs**. The world's resources are limited, so individuals, firms and governments have to make choices about what to have, what to produce and what to fund. Every decisions involves the sacrifice of the benefits of an alternative that was not chosen.

Often there are no direct outlays associated with the opportunity costs of a decision. Opportunity costs do not have to be expressed in monetary units, they may be express terms of time, satisfaction or other values.

Your Turn

What are your opportunity costs if you are stuck in a traffic jam on a motorway for an hour on your way to work?

Questions

1. What is the opportunity cost of spending an hour reading this chapter, if the best alternative would be to earn income at $100 per hour?
2. If a company is capable of producing Product A and Product B, what are the opportunity costs for the company if it uses all its resources to produce Product A?
3. Suppose you have spent three hours searching for a new laptop and found the lowest price is $300. What are your explicit and implicit costs of buying that new laptop?

Case 1

The government was tossing up between building a new hospital and buying a new ship for the navy. They do not have enough money in the budget for both, so they had to choose which project to fund. After long discussions and a vote in parliament, they have decided, by majority vote, to buy a new ship for the navy.

a) What did the government sacrificed to buy the new ship for the navy?
b) What could the government have done instead of buying the ship?
c) What was the best alternative to buying a ship for the navy?
d) What are the opportunity costs of the ship?

Case 2

Your friend is well known for loving to sleep in for an hour, and for having a nap for an hour each afternoon.

a) What are the opportunity costs of your friend attending the morning class?
b) What are the opportunity costs of your friend doing afternoon shopping?
c) What are the opportunity costs of your friend watching an early morning TV show?
d) What are the opportunity costs of your friend watching the comedy review in the late afternoon?

Case 3

1 esaC *(Case 1 the other way around)*

The government was tossing up between building a new hospital and buying a new ship for the navy. They do not have enough money in the budget for both, so they had to choose which project to fund. After long discussions and a vote in parliament, they have decided, by majority vote, to build a new hospital.

a) What did the government sacrificed to build the new hospital?
b) What could the government have done instead of building the new hospital?
c) What was the best alternative to building a new hospital?
d) What are the opportunity costs of building the new hospital?

Reminder

Earlier I said that in economics we can illustrate concepts by one or two lines in the space bordered by horizontal and vertical axes (see Figure 1 in the previous chapter).

Reminder

Economists are rational people, simple people (I know you are laughing now) and practical people so, whenever they can, they use graphs and other shortcuts as tools to explain concepts. Economists call these tools *economic models*. Economic models simplify reality by including assumptions. For example, if I want to talk about opportunity costs, I shall assume that everything else is held constant and that there is a choice between only two products. In reality, you would have to choose between lots of different products and services, but reducing it to only two products make the discussion simpler.

Instead of saying 'while everything else is held constant' in an economic model, economist will often use the phrase *ceteris paribus*. I have it in mind every time I give you an example. To make the economic principles clear, I change one thing at a time, *ceteris paribus*. **Be careful**: I shall not say *ceteris paribus again, you will have to say it to yourself every time I give you an example.*

Reminder

Resources are limited, so you frequently have to **chose one alternative over another** and therefore encounter **opportunity costs**.

I shall illustrate this statement with a single line on a graph. It is like the lines in Figure 2 in the previous chapter, but this time it uses a different coordinate system. Instead of *P* and *Q*, the axes represent the quantities *A* and *B* of two alternative products.

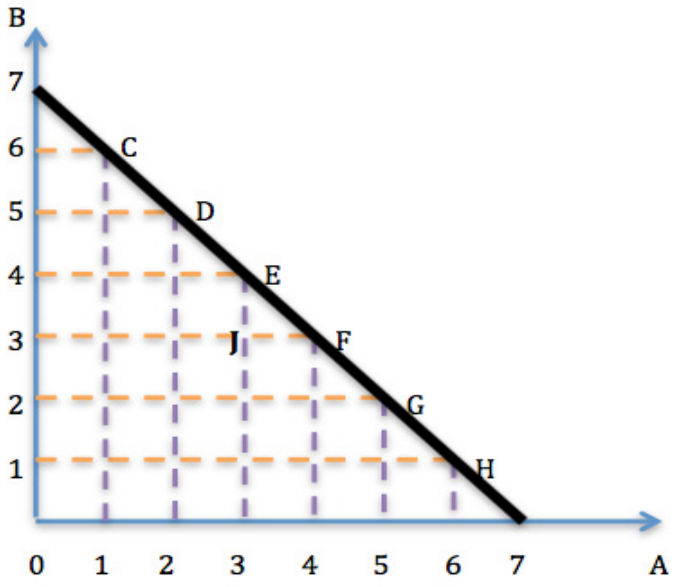


Figure 5

In this economic model I shall assume that there are only two alternatives: Product A and Product B. The model illustrates the **trade-offs** when choosing one of these products instead the another. For example, if I chose to have 7 of Product A, I cannot chose any of Product B, as you can see from the point A=7 & B=0 (and *vice versa*, as you can see from the point A=0 & B=7). However there are some combinations of the two products that I could chose. For example, I could choose a combination of 4 of Product A and 3 of Product B, as you can see from Point F (A=4 & B=3). Figure 5 shows all the possible combinations, from Point C to Point H on the **black** line: A=1 & B=6, A=2 & B=5 and so on.

In addition, the **black** line illustrates the results of a scarcity of resources; it shows the trade-offs that the scarcity entails; it shows the **opportunity costs**. By choosing to have Product A, I have to sacrifice Product B. If I want to have seven Product A, I have to sacrifice seven Product B and *vice versa*. Moreover, every increase of one Product A entails a corresponding sacrifice of one Product B.[2] In other words, the opportunity cost of having one Product A is sacrificing one Product B. The opportunity cost in this example is 1.

Because of the quantities of these two products have an inverse relationship, the black line slopes downwards, which means that when either product is increased the other is decreased. Not only does any increase in Product A entail a sacrifice of Product B but also, *vice versa*, any increase in Product B entails a sacrifice of Product A, as you can see as you move upwards on the black line, for example from Point D to Point C.

Questions

Questions 4 to 8 refer to Figure 5

4. What are the opportunity costs of having Product A?
5. What are the opportunity costs of having Product B?
6. What are the opportunity costs of having one less of Product B?
7. What are the opportunity costs of having one additional Product A?
8. At the combination illustrated by Point G, how much would it costs to have five Product A?

Reminder

Each concept in economics has two sides.

So far I have considered things from the customer's point of view. I have shown how customers face trade-offs and therefore face opportunity costs. However, the same concept applies to companies and governments when they act as suppliers.

I shall illustrate the opportunity costs of a supplier using the same diagram (Figure 5), but first I need to adjust my assumptions. Instead of talking about a customer acquiring one product or another, I shall consider a firm that has to choose which combination of products to produce with the limited resources it has available.

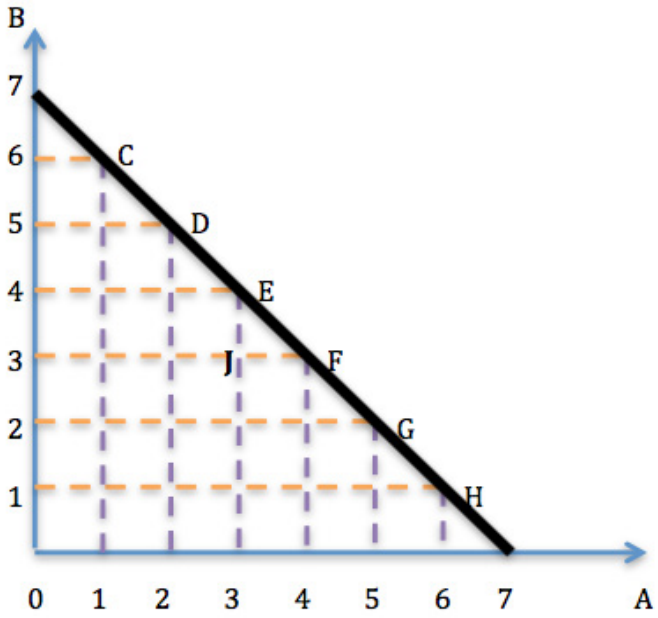


Figure 5 again

The next change is that the black line is now called the *production possibility frontier* or *PPF curve*. The PPF curve shows how much of a product it is possible to produce with the available resources. The firm can produce seven Product A and no Product B, or no Product A and seven Product B, or any other combination represented by the points C to H.[3]

Any government, too, has to face limits to its resources. It has to choose which products to acquire, for example a navy ship or a hospital. In this case it is acting as a customer. It also has to chose which projects to fund, for example infrastructure or public goods, in which case it is acting as a supplier.

4.2 Challenge

In the previous example, opportunity costs were constant (at 1). What would the PPF curve look like if there were increasing opportunity costs? Use the data in Table 3 to draw the PPF curve.

A	B
0	160
20	140
40	100
60	40
70	0

Table 3

4.3 Summary

In this chapter I illustrated one of the facts of life: we cannot have everything we want because of there limited resources. Limited or scarce resources force us to make a choice about which products and services to acquire and which to sacrifice. Each time we make a choices, we incur implicit costs, which in economics are called opportunity costs. These are the costs of the foregone alternative. Finally, I have shown that not only customers encounter scarcity but also firms and governments.

5 The Second Principle: desire versus availability

5.1 Learning objectives

After studying this chapter you will be able to

- make use of another important concept in economics: **demand and supply**
- recognise the actions of **suppliers and customers**
- distinguish between **changes in demand** and **changes in the quantity demanded**
- distinguish between **changes in supply** and **changes in the quantity supplied**

5.2 The demand side of the market

Economics is all about understanding how incentives and disincentives affect typical human behaviour, how **economic humans** might behave in an everyday situation. Suppose you have been buying one 300 ml bottle of water for $6 every day. One morning you find that the price has gone down to $5, so you are enticed to buy two bottles. The next morning the price of water goes down to $4 and you are tempted to buy three bottles. As the price goes down even further, you buy more and more, as you can see in Table 4. Finally, when the price goes down to $1 you buy six bottles.[4]

Prices in $ *P*	**Quantities** in units *Q*
6	1
5	2
4	3
3	4
2	5
1	6

Table 4: demand schedule

Now think about it the other way round. Every day you have been buying six 300 ml bottles of water for $1 each. One morning you find the price has gone up to $2, so you are only willing to buy five bottles. The next morning the price goes up to $3 and you decide you can only afford four bottles at that price. For the sake of argument again, suppose the price goes up to $4 and you buy three bottles; when the price is $5 you buy two bottles. Finally, when the price reaches $6 you buy one only bottle.

As you know by now, you can illustrate this behaviour as a line on a graph. *Whenever you can replace human judgement by a formula or a graph, you should at least consider it* (Kahneman, 2012, p. 233). The numbers for you as a customer (Table 4) just happen to be the same as those for the supplier I discussed in the previous chapter (Figure 5), but in this case the axes represent Quantity, *Q,* and Price, *P,* instead of Product A, and Product B.

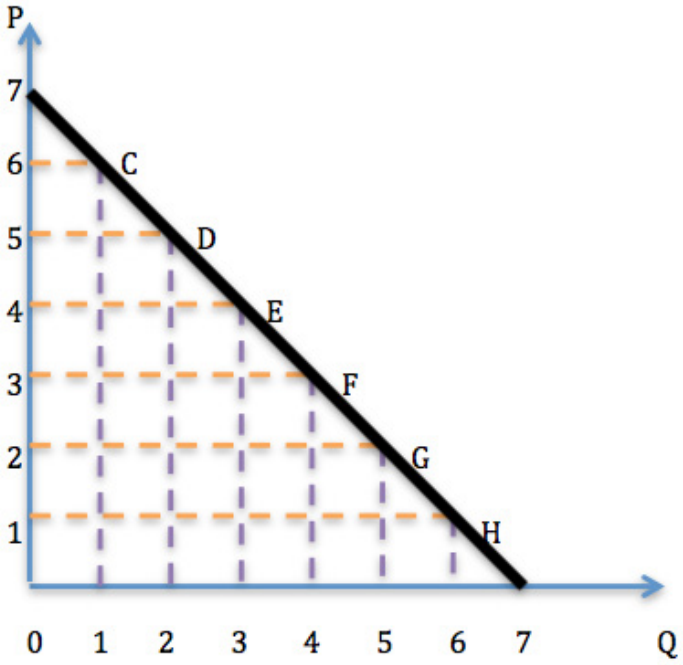


Figure 6

A move downwards towards 0 on the P axis in Figure 6 is equivalent to a reduction in the price. You can see that if the price goes down the customer is enticed to buy more of the product and, *vice versa*, if the price goes up the customer will reduce the quantity demanded. As always, I connect the related *Q* and *P* points: Point C (*Q*=1 & *P*=6), Point D (*Q*=2 & *P*=5) and so on. The resulting black line is the demand curve.

This demand curve shows how a typical, rational customer would behave in the market situation I described above. The curve is downward sloping, which indicates an inverse relationship between the price and quantity .

Questions

Questions 1–4 are based on Figure 6, which illustrates your willingness to pay for a certain item.

1. How much you are willing to pay for three items?
2. If the price is $3, how many items will you buy?
3. How many items would you take if they were free?
4. If the price is $7, how many items would you buy?

To summarise, when the **price goes down** you are more willing to **buy more** of a product and, *vice versa*, when the **price goes up** you **reduce the quantity you demand**. This principle is called the *Law of Demand*.

The Law of Demand states that there is an **inverse relationship between the price and quantity**. When the **price is increasing**, **the quantity demanded is decreasing** and *vice versa*. The Law of Demand explains the behaviour of customers when they are faced with changing prices.

So far I have discussed the behaviour of a customer when the price of the product changes. In Figure 6, the demand curve shows that when the price changes the quantity demanded changes in the opposite direction. For example, going down the demand curve from Point C to Point D, you can see that when the price goes down from \$6 to \$5, the quantity demanded goes up from one unit to two units. Going in the opposite direction from Point F to Point E, you can see that when the price goes up from \$3 to \$4, the quantity demanded goes down from four units to three units.

Remember

- **When the price of a product or a service changes, the QUANTITY DEMANDED changes in the opposite direction, which is illustrated by a MOVEMENT ALONG the demand curve.**
- **When you observe movements up or down the demand curve, you know there are changes in the quantity demanded.**
- **Changes in the quantity demanded caused by changes in the price of a product are represented graphically by movement along the demand curve.**

Don't get confused

Movement along the demand curve is caused by changes in the price of the product and corresponding changes in the quantity demanded.

Questions

5. What does movement along the demand curve illustrate?
6. Which factor causes changes in the quantity demanded?
7. What causes an upward movement along the demand curve, and what causes a downward movement along the demand curve?

Aside

'Whether you think you can or you think you can't,
you're probably right.'

'If you fail to plan, you plan to fail.'

Shortcut

I know this shortcut may seem confusing at first, but it can help you to remember the idea:

$\Delta P \Rightarrow \Delta Qd \Rightarrow$ Movement along

The Greek capital letter delta, **Δ**, means a change, so **Δ*P*** means a change in ***P***rice and **Δ*Qd*** means a change in ***Q***uantity ***d***emanded. You can read the shortcut as:

> *A **change in price** causes a **change in the quantity demanded,** which implies a **movement along** the demand curve.*

I am sure you need a break after that!
Try listening to *Everybody Hurts* by the band R.E.M.

Reminders

- The **Law of Demand** states that when the **price is increased, the quantity demanded is decreased** and *vice versa*: there is an **inverse relationship between price and quantity**.
- **When the price of a product or service changes, the QUANTITY DEMANDED changes in the opposite direction, which is illustrated by MOVEMENT ALONG the demand curve.**
- A **change in price** causes a **changes in the quantity demanded,** which is illustrated by a **movement along** the demand curve.

So far I have only discussed the behaviour of customers when there is a change in the price of the product itself. I shall go on to consider what else might affect your desire for a particular product or service, for example cans of Coke, but first I shall use some imaginary figures to plot the demand curve.

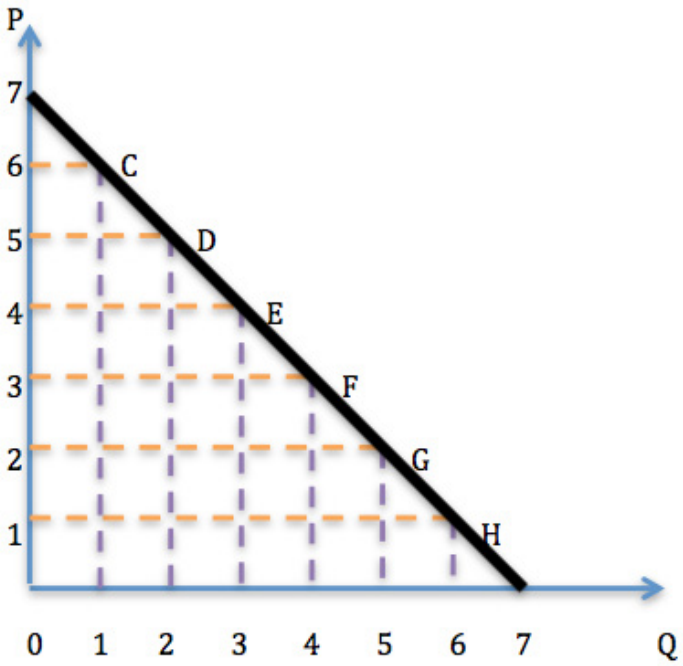


Figure 7: demand for Coke

Point F, for example, shows that you are willing to buy four cans of Coke at $3 each. If the price changes upwards, the quantity demanded goes down and *vice versa,* which is seen as movement along the demand curve. There is nothing new so far, but now things get a bit more complicated…

You notice that the price of a can of Pepsi in the same market is $1.50. For the price of one can of Coke you could get two cans of Pepsi. Consequently, it is reasonable to expect that you will reduce your **demand** for Coke. (No, I did not say 'quantity demanded'; I was talking about the **demand** itself, and you will see why in a moment.) I assume here that you are one of **a number of customers**. I also assume that customers do not have a **preference** for one brand over the other, in which case the alternative product, Pepsi, is call a *substitute*. With these assumptions I can say that customers will buy cans of Coke only when the substitute, Pepsi, is not available at a lower price.

What will happen to the **demand curve** in this case? Instead of moving along the curve to indicate a change in price, I have to change the demand curve itself to show the change in demand.

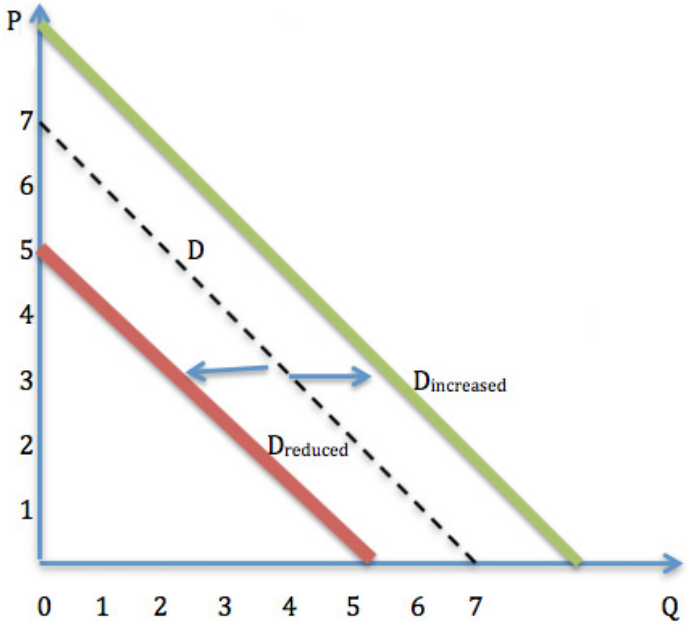


Figure 8: shifts in demand for Coke

The dotted black line in Figure 8 is the original demand curve for Coke. The solid red line shows the new, reduced demand for Coke when the alternative, Pepsi, is cheaper. The solid green line shows the opposite case when a can of Pepsi costs $3 and a can of Coke costs $1.50, and there is a corresponding increase in the demand for Coke.

This example shows that **non-price factors can cause a shift in the demand curve.** *Non-price factors* are everything except the price of the product itself, they may include the price of substitutes, customer preferences, income, the number of customers, climate change and many other influences.

5.3 Conclusion

A change in the price of a product cause a movement along the demand curve, while all other non-price factors cause the demand curve to shift.

Shortcuts

$\Delta P \Rightarrow \Delta Qd \Rightarrow$ **Movement along demand**
$\Delta nonP \Rightarrow \Delta D \Rightarrow$ **Shift in demand**

Questions

8. What is the difference between a movement along the demand curve and a shift in the demand curve?
9. If the weather influences the demand for a product, how would that be represented on a graph?
10. If the price of a product changes, what changes will you observe in the demand curve?
11. You want to buy a ball but you cannot afford it because your income is limited. How would that situation be reflected in the demand curve for the ball?
12. What can cause movement along a demand curve?
13. What is the difference between a change in demand and a change in the quantity demanded? How is this illustrated on a demand curve?
14. What does the Greek capital letter delta (Δ) mean?
15. What factors can cause shifts in the demand curve?

5.4 Challenge

Is it possible to have both a change in the quantity demanded and a shift of the demand curve at the same time?

Availability: the supply side of the market

Earlier I talked about customers; in this section I shall switch to thinking as a supplier. In any market, supply represents the other side of the coin to demand.

You will find it much easier to master the discussion of supply if you have already mastered the demand side. To understand the supply side, you take almost everything you learnt about the demand side and turn it upside down.

You have already seen how customers dislike price increases and how this dislike is reflected in reductions in the quantity demanded. On the other hand, suppliers like to see an increase in the price of their product, and their liking is reflected in an increase in the quantity supplied. When the price of a product goes up, more of that product is made available in the market.

Example

Now suppose you have been selling one 300 ml bottle of water for $1 every day. One morning you find that the price has gone up to $2, so you are enticed to sell two bottles. The next morning the price of water goes up to $3 and you are tempted to sell three bottles. As the price goes up even further, you offer more and more for sale, as you can see in Table 5. Finally, when the price goes up to $6 you sell six bottles.[5]

Prices in $ *P*	**Quantities** in units *Q*
1	1
2	2
3	3
4	4
5	5
6	6

Table 5: supply schedule

In short, when the price of a product goes up, you are willing to supply more of it and, *vice versa,* when the price goes down you are willing to supply less.

Remember

Whenever you can replace human judgement by a formula or a graph, you should at least consider it (Kahneman, 2012, p. 233). With that advice in mind, I shall plot the data from Table 5 on a graph.

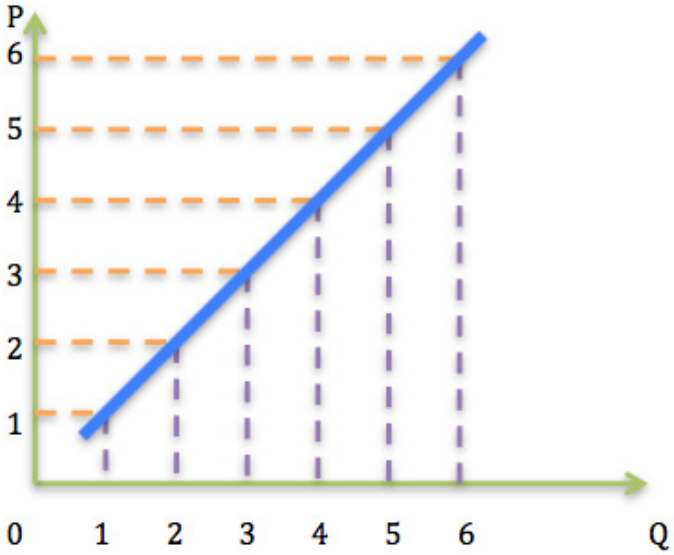


Figure 9: supply curve

The blue line in Figure 9 shows how you behave as a supplier. Such a line in economics is called a *supply curve*. **When the price increases** you offer more for sale**, the quantity supplied increases.** This is called *The Law of Supply*.

The Law of Supply states that there is the **direct relationship between price and quantity.** When the **price is increasing, the quantity supplied is increasing**. The Law of Supply describes the behaviour of **suppliers** when they are faced with changing prices.

Suppliers have to decide how many products they are willing to supply at any given market price. These decisions are represented by the points on the supply curve. As you can see from the blue line in Figure 9, when the price is $1 you are willing to supply 1 unit of the product to the market, but if the price is increased to $2 you will supply 2 units of the product and so on.

Remember

- **When the price of the product or service changes the QUANTITY SUPPLIED changes in the same direction, which is illustrated by MOVEMENT ALONG the supply curve.**
- **When you observe a movement up or down the supply curve, you know there is a change in the quantity supplied.**
- **When a change in the price of a product causes a change in the quantity supplied, it results in a movement along the supply curve.**

Don't get confused

A movement along the supply curve is caused by a change in the price of the product and the corresponding change in the quantity supplied.

Questions

16. What does movement along the supply curve illustrate?
17. Which factor causes changes in the quantity supplied?
18. What causes upward movements along the supply curve and what causes downward movement along the supply curve?

Shortcut

$\Delta P \Rightarrow \Delta Qs \Rightarrow$ Movement along supply

The Greek capital letter delta, **Δ**, means a change, so **Δ*P*** means a change in ***P***rice and **Δ*Qs*** means a change in ***Q***uantity ***s***upplied. You can read the shortcut as:

> *A **change in price** causes a **change in the quantity supplied,** which implies a **movement along** the supply curve.*

Reminders

- The **Law of Supply** states that when the **price is increased, the quantity demanded is increased**: there is a **direct relationship between price and quantity**.
- **When the price of a product or service changes, the QUANTITY SUPPLIED changes in the same direction, which is illustrated by MOVEMENT ALONG the supply curve.**
- A **change in price** causes a **changes in the quantity supplied,** which is illustrated by a **movement along** the supply curve.

So far I have only discussed the behaviour of suppliers when there is a change in the price of the product itself. I shall now consider what else might affect your willingness to supply a particular product or service.

- You may have noticed a **number of suppliers** of the same product, not just your company. If there are more firms producing the same or similar products, there may be an oversupply in the market. In this case, increased competition may cause you to reduce supply.
    - In the current digital age, **new technology** is being introduced to enable cheaper production methods. Lower production costs for product will increase the supply of that product. For example, new software used to be delivered on a CD or DVD. I am sure you remember that. Now software licences are offered on line and new software is downloaded directly to your computer, tablet or smart phone. This **cuts the supplier's production costs,** increases productivity and increases supply.
- **Reductions in the supplier's input costs** also increase supply.
    - The **expectations of suppliers** can also affect supply. For example, if news of a new version of Apple's iPhone is leaked to the media, Samsung might reduce the price of their smart phones to increase their sales before the new iPhone is released.

What would happen to your **supply** curve in Figure 9 in any of these cases? The **supply** will be increased or decreased depending which of these factor apply and how they influence supply.

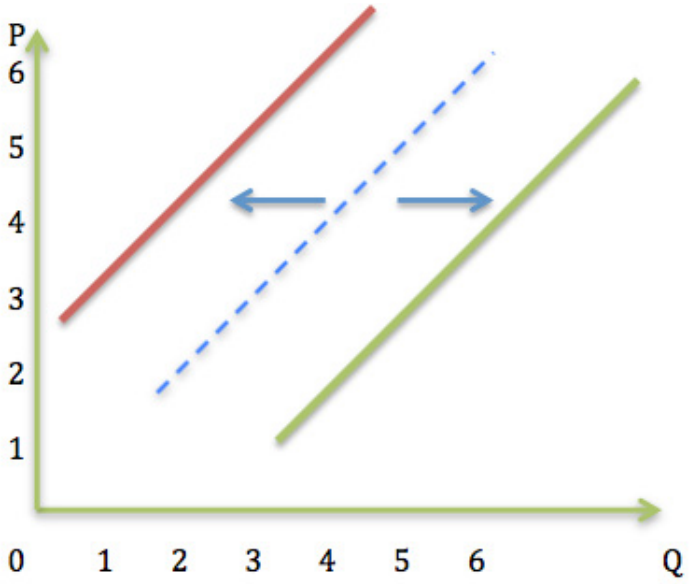


Figure 10: shifts in supply

In Figure 10 the dashed blue line is the original supply curve and the solid red line represents a new, reduced supply. This reduction in supply could have been caused by increased competition or by increased input prices making the production more expensive. The solid green line represents a new, increased supply. An increase in supply could have been caused by reduced input prices or by increased productivity.

Non-price factors can cause a shift in the supply curve. *Non-price factors* are everything except the price of the product itself, they may include the number of suppliers, technological advances, input prices, taxes, supplier expectations and many other influences.

Conclusion

A change in the price of a product cause a movement along the demand curve, while all other non-price factors cause the supply curve to shift.

Shortcuts

$\Delta P \Rightarrow \Delta Qs \Rightarrow$ Movement along supply
$\Delta nonP \Rightarrow \Delta D \Rightarrow$ Shift in supply

Your Turn

Answer questions 8, 9, 10, 12, 13 and 15 again, but this time replace demand with supply throughout the questions.

By now you are probably humming '*We don't need no education*' from Pink Floyd's *Another Brick in the Wall*. If so, always remember the words from The Police, '*Every breath you take…I'll be watching you*'

6 The Third Principle: measuring responses

6.1 Learning Objectives

After studying this chapter you will know how to

- use the concept **elasticity of demand**
- measure **customers' responsiveness** to price changes
- differentiate between **elasticity of demand, elasticity of supply** and **elasticity of income**.

In the previous chapter you saw how customers and suppliers react when the price of a product changes and also how they respond to other factors. You saw that customers react negatively to price increases but suppliers react positively to price increases. When **the price increases, customers reduce the quantity demanded** but **suppliers increase the quantity supplied**. The relationship between price and quantity is negative for customers and positive for suppliers.

Sometimes you will need to **measure the magnitude** of these responses. For example, as a company's senior economist you may be asked to prepare a report on whether to increase or decrease the price of a product in order to increase the company's revenue. Unless you know how to measure the magnitude of customer responses**,** you can only guess which way to adjust the price.

You know that customers react negatively to an increased price, so if you increase the price some of your customers will switch to the competition. In this case you might decrease the company's revenue instead of increasing it. In contrast, if you decrease the price you will get more customers to buy your product, but an increased customer base may not be enough to offset the decrease in price. In that case, too, you might decrease the company revenue. You need to know how to make accurate measurements of customer responses to changes in price.

6.2 Example 1

Every week you buy petrol for your car at $1 per litre. You wake up one Monday morning to the sound of the the radio news and you are immediately worried by an announcement of a 20% increase in the price of petrol. That means the price will now be $1.20 per litre. You could decide to drive only on weekends, reducing your petrol consumption by 15% from the current 100 litres per week.

In the opposite situation, if prices go down by 20% to $0.80, would you jump up out of the bed, singing your favourite tune, and calculate how much you will save on petrol every week?

6.3 Example 2

Every morning you buy a packet of chewing gum for $1. One day you read that the price of a packet is about to go up by 20%. You might react to this news by reducing consumption by 80%.

In these examples I have illustrated some possible reactions of a customer to price changes. In the first case, the 15% reduction in consumption was proportionally smaller than the 20% price change; in the second case, the 80% reduction in consumption was drastically larger than the 20% price change.

In this section I shall discuss the **relative size of changes in the price and in the quantity demanded.** In other words I shall examine the percentage by which the quantity demanded falls when the price rises by a certain percentage.

Economists use the concept of **price elasticity** of a product or service to **measure sensitivity of quantity demanded.** Elasticity is a measure of the proportional change in the quantity demanded compared to the proportional change in price. Algebraically, *elasticity of demand* is the ratio of the percentage change in quantity to the percentage change in price. It is normally expressed as a fraction:

elasticity of demand is $\frac{\text{percentage change in quantity demanded}}{\text{percentage change in price}}$

in short

$$E_d = \frac{\%\Delta Q_d}{\%\Delta P}$$

where

E_d	is the elasticity of demand;
$\%\Delta Q_d$	is the percentage change in the quantity demanded;
$\%\Delta P$	is the percentage change in the price.

6.4 Example 1 again

In the first example, the original price of petrol, P_0, was \$1.00 and the new price, P_1, was \$1.20, so

$$\%\Delta P = \frac{P_1 - P_0}{P_0} \times 100\% = \frac{0.20}{1.00} \times 100\% = 20\%.$$

The original quantity of petrol, Q_0, was 100 L and the new quantity, Q_1, was 85 L so

$$\%\Delta Q_d = \frac{Q_1 - Q_0}{Q_0} \times 100\% = \frac{-15}{100} \times 100\% = -15\%.$$

There is a negative relationship between the price and the quantity demanded, which is why there is a negative sign in $\%\Delta q_d$ = -15%. However, economists drop the negative sign when calculating elasticity of demand, so

$$E_d = \frac{\%\Delta Q_d}{\%\Delta P} = \frac{15\%}{20\%} = 0.75.$$

This means there is a **0.75 percent change in the quantity demanded for each one percent change in the price**. In other words, if the price is **increased** by 1%, the quantity of demand **decreases** by 0.75%. Economists understand the negative relationship between price and quantity demanded, so they express the elasticity of demand as 0.75, not -0.75.

6.5 Example 2 again

In the second example, the original price of chewing gum, P_0, was \$1.00 and the new price, P_1, was \$1.20, so

$$\%\Delta P = \frac{P_1 - P_0}{P_0} \times 100\% = \frac{0.20}{1.00} \times 100\% = 20\%.$$

There was an 80% reduction in the quantity demanded:

$$\%\Delta Q_d = -80\%.$$

There is a negative relationship between the price and quantity demanded, which is why there is a negative sign in $\%\Delta Q_d$ = -80%. However, economists drop the negative sign when calculating elasticity of demand, so

$$E_d = \frac{\%\Delta Q_d}{\%\Delta P} = \frac{80\%}{20\%} = 4.$$

The elasticity of demand is four. **There is a four percent change in the quantity demanded for each one percent change in the price**. In other words, if the price is **increased** by 1% the quantity of demand **decreases** by 4%.

There is a logic behind dropping the minus sign. Elasticity is a measure of sensitivity to change. Something can be more or less sensitive, or even completely insensitive, but there is no such thing as negative sensitivity. The minus sign would only be there for the sake of mathematical correctness, indicating the negative relationship between price and quantity demanded.

From now on I shall drop the negative sign without mentioning it.

6.6 Example 3

Suppose P_0 = \$1, P_1 = \$1.20, Q_0 = 10 and Q_1 = 8. Then

$$E_d = \frac{\%\Delta Q_d}{\%\Delta P} = \frac{20\%}{20\%} = 1.$$

These three values, 0.75, 4 and 1, illustrate three types of price elasticity. If the elasticity is **less than one**, economists say the demand is *inelastic*; if the elasticity is **greater than one**, they say the demand is *elastic*; if the elasticity is **equal to one**, they say the demand has *unit elasticity*.

$E_d < 1$ ⇒ **inelastic** demand

$E_d > 1$ ⇒ **elastic** demand

$E_d = 1$ ⇒ **unit elasticity**

Even though it is a straight line, the black line in Figure 11 is a demand curve that illustrates different elasticity in different parts of the curve.

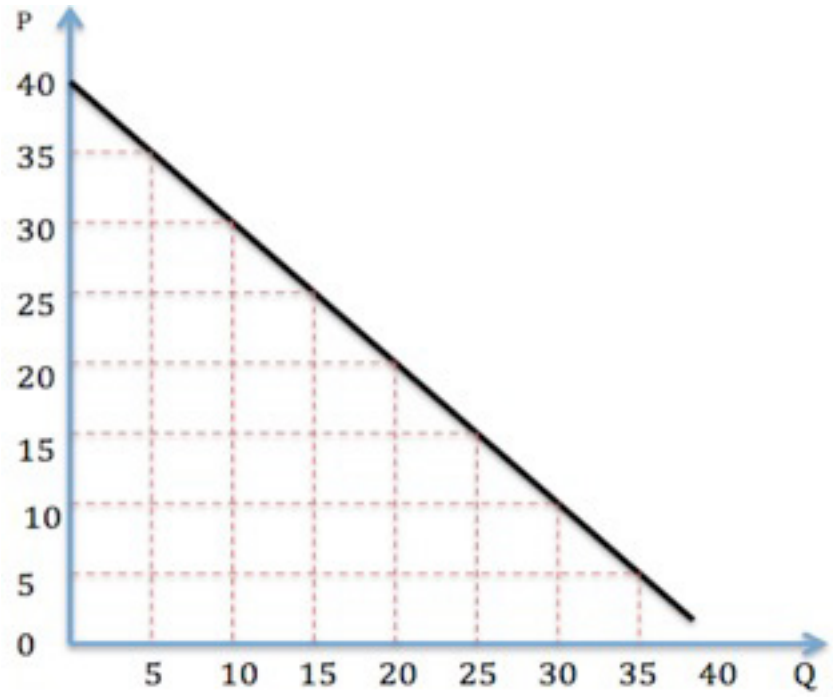


Figure 11: elasticity of demand

Going down this line, from left to right, the demand curve displays a range of values for elasticity. From \$40 to down to \$20, the demand is elastic; at \$20 there is unit elasticity; further down, the demand is an inelastic.

Recall that the price elasticity of demand is a ratio of **percentage** changes. At the upper end of the demand curve, quantities demanded are lower and prices are higher, so a small **percentage** change in price can cause a large **percentage** change in quantity. For example, if the price is increased from \$30 to \$35, the quantity demanded is reduced from 10 to 5. Putting these numbers into the formula for price elasticity,

$$E_d = \frac{\%\Delta Q_d}{\%\Delta P} \approx \frac{50\%}{16\%} \approx 3.12 > 1,$$

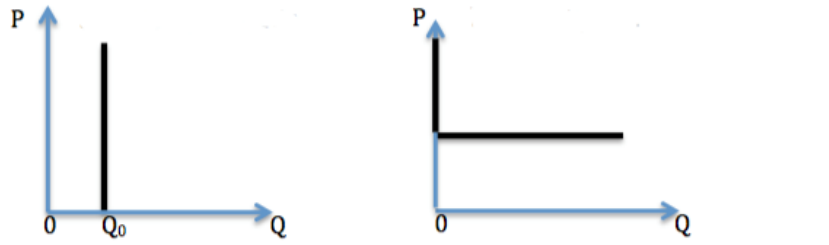
confirms that demand is elastic towards the top of the curve.

The opposite will happen towards the other end of the curve. A price increase from \$5 to \$10 would cause a reduction in quantity demanded from 35 to 30. In that case,

$$E_d = \frac{\%\Delta Q_d}{\%\Delta P} \approx \frac{16\%}{100\%} \approx 0.16 < 1,$$

which confirms that demand is inelastic towards the bottom of the curve.

Apart from these three types of elasticity, there is a theoretical possibility of perfectly elastic demand or perfectly inelastic demand.



a) perfectly inelastic demand b) perfectly elastic demand

Figure 12: price elasticity of demand

A completely vertical section of a demand curve would represent *perfectly inelastic* demand. For example, a medication might be so important to its consumers that the quantity demanded, Q_0, would be the same regardless of price.

In contrast, a completely flat section would represent *perfectly elastic* demand. For example, a product would have perfectly elastic demand if the quantity demanded was theoretically infinite when the price was \$100, but reduced to zero as soon as the price went up to \$100.01.

6.7 Revenue and elasticity

I began this chapter by asking you to imagine that you were advising a firm how to increase its revenue. You have to decide whether to increase or decrease the price of the firm's product. You now need to apply your knowledge about elasticity of demand to tackle this problem.

The *total revenue* (or just the *revenue*) is the total amount of money a firm gets from the sale of its products or services. For example, a firm sold 100 units of a product at \$5 each. To get the revenue from these sales, multiply the quantity sold by the sale price. The total revenue, *TR*, in this case is \$500.

$$TR = P \times Q = \$5 \times 100 = \$500.$$

To show how revenue can be linked to elasticity, I shall consider three separate cases: elastic demand, inelastic demand and unit elasticity.

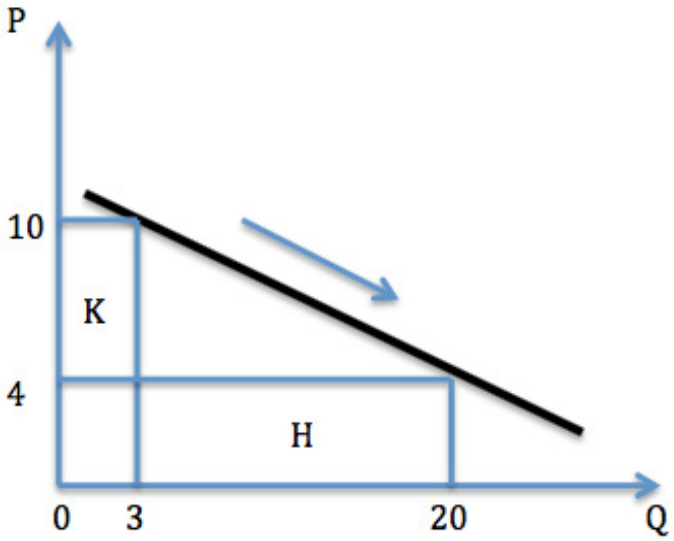


Figure 13: elastic demand $E_d > 1$

As you saw earlier, the flatter the demand curve, the more elastic the demand is. In Figure 13, when the **price was decreased** from \$10 to \$4, the **quantity demanded was increased** from 3 to 20.

$$\%\Delta P = \frac{4-10}{10} \times 100\% = -60\%;$$
$$\%\Delta Q = \frac{20-3}{3} \times 100\% \approx 567\%.$$

Comparing these proportional changes, you find that the price is elastic:

$$E_d = \frac{\%\Delta Q}{\%\Delta P} \approx \frac{567\%}{60\%} \approx 9.4 > 1$$

The total revenue, *TR*, is calculated by multiplying the number of units sold by their price, $P \times Q$. In addition, you know from geometry that you get the area of a rectangle by multiplying its height by its width. For example, the area of the rectangle, H, below the curve is calculated as $P \times Q = 4 \times 20 = 80$. Therefore the total revenue at any point on the demand curve is equal to the area of the rectangle under the curve at that point.

Now compare the revenue at the original price, the area of K, with the revenue at the reduced price, the area of H. The original revenue was $P \times Q = 10 \times 3 = 30$ and the new revenue is $P \times Q = 4 \times 20 = 80$. Revenue has **increased** by \$50.

When demand is elastic, a reduction in the price will result in an increase in the revenue and, *vice versa*, an increase in the price will result in a decrease in revenue. There is a negative relationship between price and revenue.

$E_d > 1$: *P* reduced ⇒ *TR* increased

In contrast, when demand is inelastic, there is a positive relationship between price and revenue.

$E_d < 1$: *P* reduced ⇒ *TR* decreased

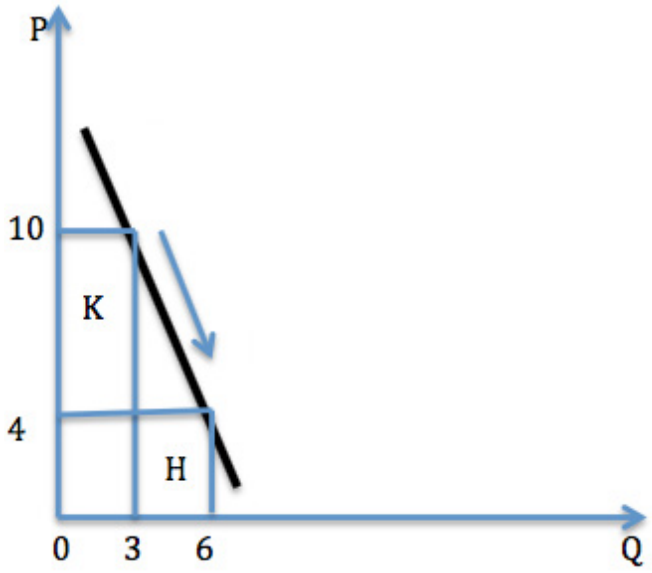


Figure 14: inelastic demand $E_d < 1$

From Figure 14 you can see that the new revenue, H, is smaller than the original revenue, K.

Finally, when there is unit elasticity of demand there is no change in the total revenue. In this case H = K.

$E_d = 1$: *P* reduced ⇒ *TR* unchanged

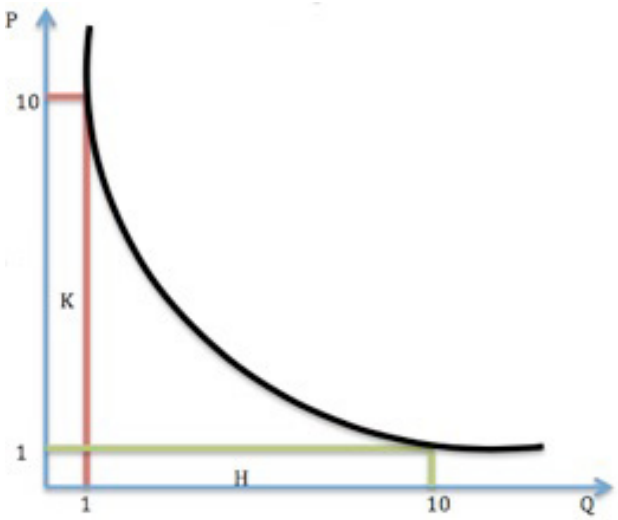


Figure 15: unit elasticity $E_d = 1$

Questions

1. What does elasticity mean?
2. If the proportional change of quantity demanded is larger than the proportional change in price, which type of elasticity is this?
3. If the proportional changes in quantity demanded and price are equal, which type of elasticity is this?
4. Explain in your own words why the price elasticity of demand always has a negative sign.
5. If you found the price elasticity of *demand* was 3, how would you interpret it?[6]

Further discussion

Before I go any further I need to clarify two points.

First, why do you have to use percentages when calculating elasticity? The answer is that elasticity would otherwise be a ratio of two different units of measurement. **Price** is expressed in **monetary** units while **quantity** may be expressed in kilograms, litres, metres or any other convenient unit. It makes sense algebraically for the units in a ratio to be the same. Economists avoid this problem by using percentages to calculate elasticity because a percentage is a unit-less measure.[6]

Secondly, when you measure a change, you move along the demand curve from the Point A to Point B, but you could also calculate the change by moving in the opposite direction from B to A. One way would represent an increase in price, the other way would represent a decrease in price. The distance on the graph is the same in each case, but the algebraic formula will give a different value for the elasticity.

Suppose, for example, that in going from Point A to Point B you observe an increase in price from \$5 to \$10. This is a 100% increase in price. However, going the other way, a decrease from \$10 to \$5 its a decrease of 50%.

I shall illustrate this anomaly by returning to Example 1 where a increase in the price of petrol caused a fall in the quantity demanded. In this example, the original price of petrol, P_0, was \$1.00 and the new price, P_1, was \$1.20, so

$$\%\Delta P = \frac{P_1 - P_0}{P_0} \times 100\% = \frac{0.20}{1.00} \times 100\% = 20\% .$$

The original quantity of petrol, Q_0, was 100 L and the new quantity, Q_1, was 85 L so

$$\%\Delta Q_d = \frac{Q_1 - Q_0}{Q_0} \times 100\% = \frac{-15}{100} \times 100\% = -15\% .$$
$$\therefore \quad E_d = \frac{\%\Delta Q_d}{\%\Delta P} = \frac{15\%}{20\%} = 0.75 .$$

Going the opposite way, a decrease in the price of petrol caused an increase in the quantity demanded. In this case, the original price of petrol, P_0, is \$1.20 and the new price, P_1, is \$1.00, so

$$\%\Delta P = \frac{P_1 - P_0}{P_0} \times 100\% = \frac{-0.20}{1.20} \times 100\% \approx -16.7\% .$$

The original quantity of petrol, Q_0, is 85 L and the new quantity, Q_1, is 100 L so

$$\%\Delta Q_d = \frac{Q_1 - Q_0}{Q_0} \times 100\% = \frac{15}{85} \times 100\% \approx 17.6\% .$$
$$\therefore \quad E_d = \frac{\%\Delta Q_d}{\%\Delta P} \approx \frac{17.6\%}{16.7\%} \approx 1.06.$$

As you can see, the price elasticity of demand comes out as 0.75 when you use an increasing price, and that means demand is inelastic. However, when you deal with the same change in the other direction, the price elasticity comes out as 1.06, and that means demand is elastic.

To avoid this anomaly and calculate a more precise value for elasticity, you can use average changes in price and quantity. The formula for elasticity becomes

$$E_d = \frac{(Q_1 - Q_0)/(Q_1 + Q_0)}{(P_1 - P_0)/(P_1 + P_0)} = \frac{(100 - 85)/(100 + 85)}{(100 - 120)/(100 + 120)} \approx \frac{-8.1\%}{9.1\%} \approx -0.89$$

so elasticity of demand is 0.89. This more precise value means that demand for petrol is inelastic.

Price elasticity of supply

Remember there is a positive relationship between price and quantity supplied, in contrast to the negative relationship between price and quantity demanded.

The negative relationship between price and quantity demanded means there is always a negative sign in the result when you calculate elasticity of demand, even though economists drop the negative sign.

The positive relationship between price and quantity supplied means you always get a positive result when you calculate the price elasticity of supply, so there is no negative sign to drop. Apart from that, the interpretation is very similar. You calculate the elasticity of supply, E_s, using the percentage change in the quantity supplied, $\%\Delta Q_s$. For example

$$E_s = \frac{\%\Delta Q_s}{\%\Delta P} \approx \frac{10\%}{70\%} \approx 0.14.$$

This result means that for each percent increase in price, the quantity supplied would increase by 0.14 percent. And, *vice versa*, for each 1% decrease in price, the quantity supplied would decrease by 0.14%.

Income elasticity

The next type of elasticity is a measure of the relationship between the quantity demanded and a customer's income. *Income elasticity*, E_i, relates a change in quantity, $\%\Delta Q_d$, to a change in income, $\%\Delta I$, rather than to a change in price:

$$E_i = \frac{\%\Delta Q_d}{\%\Delta I}.$$

Elasticity of income can be positive or negative depending on whether there is a positive or negative relationship between quantity and income. It is positive if the quantity demanded increases whenever income increases. In that case the product in question is called a *normal product* or a *normal good*[7]. Otherwise, if the quantity decreases whenever income increases, the elasticity of income is negative and the product is called an *inferior product* or an *inferior good*.

Cross price elasticity

The last type of elasticity I shall mention is cross price elasticity. It is like the price elasticity of demand except that it considers the changes in the quantity demanded of one product in response to changes in the price of another product. *Cross price elasticity*, E_c, is the ratio of the percentage change in the quantity of Product 1, $\%\Delta Q_1$, to the percentage change in the price of Product 2, $\%\Delta P_2$:

$$E_c = \frac{\%\Delta Q_1}{\%\Delta P_2}.$$

For each one percent change in the price of Product 1, the quantity demanded of Product 2 changes by E_c percent. For example, suppose

$$E_c = \frac{\%\Delta Q_{Pepsi}}{\%\Delta P_{Coke}} = \frac{1\%}{7\%} \approx 0.14.$$

This means that for each 7% increase in the price of Coke the quantity demanded of Pepsi increases by 1%, or for each 1% increase in the price of Coke, the quantity demanded of Pepsi increases by 0.14%.

In cross price elasticity, the sign of the calculated result is very important. A positive value for E_c indicates a positive relationship between Q_1 and P_2; a negative value indicates a negative relationship.

If their cross price elasticity is positive, products are called *substitutes*; if their cross price elasticity is negative, products are called *complements*.

In the previous example cross price elasticity was 0.14, which is positive, so Coke and Pepsi are substitute products. If you calculate the cross price elasticity of coffee and sugar it might come out as a negative number because coffee and sugar go together. In that case coffee and sugar would be classified as complementary products.

Questions[7]

5. If you found the price elasticity of *demand* was 3, how would you interpret it?
6. If you found the price elasticity of *supply* was 3, how would you interpret it?
7. If you found that income elasticity was 3, how would you interpret it?

8. If the cross-price elasticity of two products is positive what can you conclude about these products?

9. If the cross-price elasticity of two products is negative what we can conclude about these products?

10. Explain the difference between price elasticity of demand and price elasticity of supply.

7 The Fourth Principle: negotiations

7.1 Learning objectives

After studying this chapter you will know how to

- make use of the concepts **market** and **market forces**
- recognise the point where **demand and supply** quantities **are equal**
- identify **different market structures**

Until now I have discussed each of 'Those two lines' separately: **demand** and **supply**. In this chapter I shall bring them together. Using demand and supply together, you can illustrate how markets work efficiently, and you can apply economic theory to many areas of the real life.

First I shall describe markets and market forces. Then I shall bring them together in a balance of demand and supply.

7.2 Competitive markets

Markets are places where **customers** meet **suppliers**. These are not only physical places like the local fresh food market or the local stock exchange but also cyberspace markets like eBay or NASDAQ. The behaviour of **customers** in a market is represented by the **demand curve** and the behaviour of **suppliers** is represented by the **supply curve**. A *competitive market* is one where customers and suppliers negotiate the price and quantity based on their respective goals, free from coercion and outside interference.

Suppliers want to sell their product at the highest possible price, while customers want to buy the product at the lowest possible price. When these two opposing market forces meet, buyer and seller have to negotiate until they agree on a price and a quantity. In other words, they have to find the price and the quantity at which both the customer is willing to buy and the supplier is willing to sell. These agreed figures are called the *market clearing price* and the *market clearing* quantity. In short, they have to negotiate until the **quantity demanded** and the **quantity supplied** are **equal**. This is represented by the **equilibrium point** on the graph, the point of intersection of the demand and supply curves.

7.3 Example 1

Imagine you are at a fairground where, apart from the usual fun activities, there is a tug-of-war. On one side there are customers and on the other side there are suppliers. Each side is trying to pull the other over a line in the middle. After several attempts by each side to overpower the other, they settle at one point where neither side can pull the other any further. At that point they have equal strength, they are in balance, they are at the **point of equilibrium**.

7.4 Example 2

One morning you want to buy a kilo of tomatoes from a supplier at the local fresh produce market. The ticket price is $6 per kilogram but you think the price is too high. You negotiate a price reduction which the supplier will accept, but the supplier will only accept it if you agree to buy more tomatoes. You settle on a price of $3.50 per kilo for 3.5 kg of fresh tomatoes. Because you and the supplier have reached the point of equilibrium, these are the **market clearing price** and the **market clearing quantity** for tomatoes on this occasion.

Figure 16 shows this market negotiation process graphically by plotting demand and supply curves together in one coordinate system.

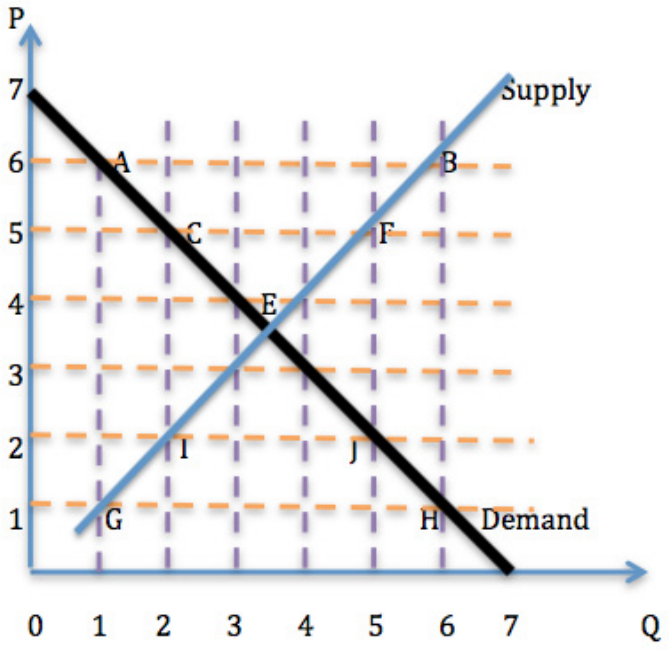


Figure 16: the market for tomatoes

The market price for tomatoes started at $6 per kilo and, at that price, there were 6 kg of tomatoes on offer. This is the **quantity supplied** at **Point B**. However, at that price there was only demand for one kilo of tomatoes, the **quantity demanded** at **Point A**. The quantity supplied was greater than the quantity demanded. At $6 per kilo there was a surplus of 5 kg of tomatoes, which is represented by the distance from Point A to Point B.

Later the price was reduced to $5. At this price suppliers were willing to supply 5 kg but there was still an oversupply of tomatoes. There was a surplus of 3 kg which is represented by the **distance from Point C to Point F**.[8] Further negotiations lead to the next iteration of the price: $4 per kilo with 4 kg as the quantity supplied. Finally the customers and suppliers settled on a price of $3.50 and a quantity of 3.5 kg **where the quantity demanded is equal to quantity supplied**. They reached the point of equilibrium.

Now imagine that things had gone in the opposite direction. Suppose the morning started with a market price of $1 per kilo. At that price there was 1 kg of tomatoes on offer, the **quantity supplied at Point G**. At that price there was a demand for 6 kg of tomatoes, the **quantity demanded at Point H**. The quantity supplied was less than the quantity demanded. At $1 per kilo there was a shortage of 5 kg of tomatoes, which is represented by the distance from Point G to Point H.

Later the price was increased to $2, at which price suppliers were willing to supply 2 kg, but the quantity demanded was 5 kg, so there was a shortage of 3 kg, which is represented by the distance from Point I to Point J. Further negotiations lead to the next iteration: a price of $3 and a quantity demanded of 4 kg. Finally the customers and suppliers settled on a price of $3.50 and a quantity of 3.5 kg where the quantity demanded is equal to quantity supplied. They reached the point of **equilibrium**.

7.5 Summary

- The market worked well in this example, getting suppliers and customers to the most efficient outcome, where the market clearing price and the quantity were established at the equilibrium point.
- Negotiations in the market lead to the establishment of the equilibrium point where the quantity demanded and the quantity supplied are equal.
- Price changes caused movement along the demand and supply curves, 'Those two lines,' the black and blue lines in Figure 16.

Remember

A change in the price of the product itself causes movement along the demand or supply curve; all non-price factors cause shifts in the demand or supply curves. **But what impact will these non-price factors have on negotiations in the marketplace?**

What would happen to prices and to the equilibrium point in a market if there was a change in the number of suppliers or the number of customers? You know these non-price factors cause shifts of the demand or supply curves, but how would these shifts impact on prices, quantities and the equilibrium point? **I shall answer these questions in this section** by continuing my explanation of market functioning.

I shall start with a **change in the number of customers**. For example, if you took everyone from your class to the market to buy tomatoes, this would cause a shift in the **demand curve**. The number of customers has increased, so demand will increase, but supply will stay the same. This can be illustrated by a **rightward shift** of the demand curve while the supply curve remains unchanged.

You know from Figure 14 that the price and quantity originally settled at an equilibrium point, $3.50 and 3.5 kg, which is represented by Point E on the graph.

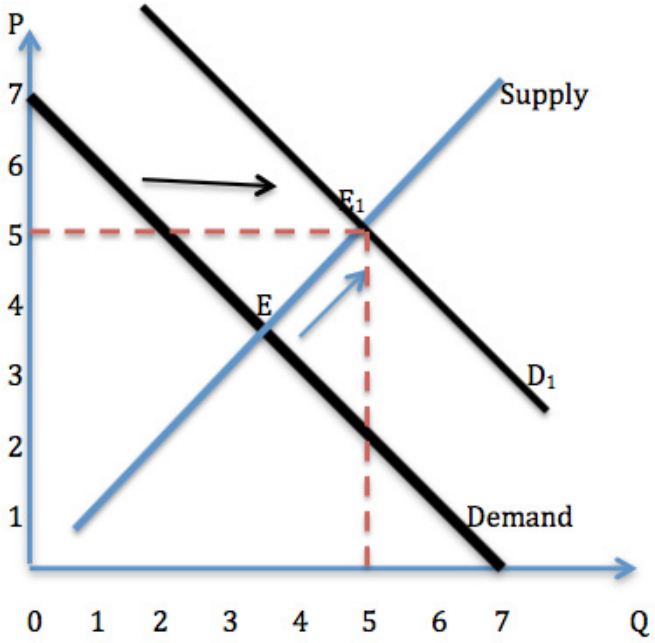


Figure 17: increase in demand

When a non-price factor causes an **increase in demand**, the original demand curve, the thick black line in Figure 17, shifts to a new position, labelled $\mathbf{D}_1$. This corresponds to a move along the supply curve, so a new equilibrium is established at Point $\mathbf{E}_1$. The new point of equilibrium entails an increase in the price of tomatoes from $3.50 to $5 and an increase in quantity from 3.5 kg to 5 kg.

This causation chain can be summarised as

Increase in **demand**
⇒ Increase in **equilibrium** price
⇒ Increase in **quantity supplied**

or shift demand right ⇒ price up ⇒ movement up supply curve. Also, *vice versa,*

Decrease in **demand**
⇒ Decrease in **equilibrium** price
⇒ Decrease in **quantity supplied**

or shift demand left ⇒ price down ⇒ movement down supply curve.

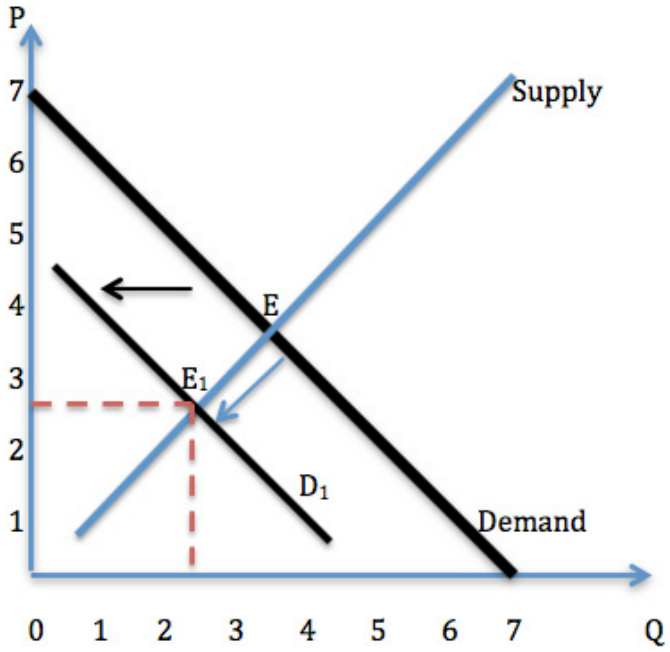


Figure 18: decrease in demand

Now assume that the demand curve is unchanged but some non-price factor causes an increase in supply. Perhaps an increase in the number of suppliers causes a shift of the supply curve.

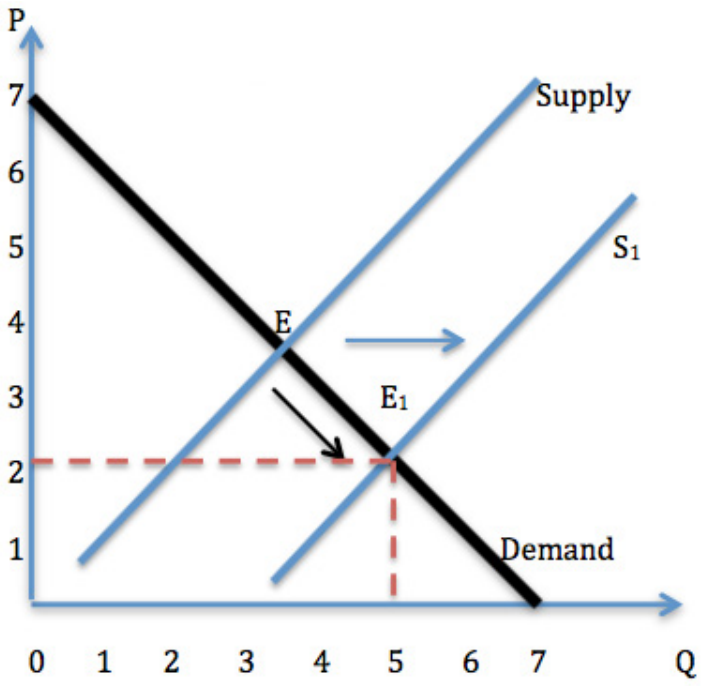


Figure 19: increase in supply

It is clear from Figure 19 that an increase in supply would begin a causation chain:

Increase in **supply**
⇒ Decrease in **equilibrium** price
⇒ Increase in **quantity demanded**

or *shift supply right ⇒ price down ⇒ movement demand curve.*

Also, *vice versa,* if a non-price factor such as a decrease in the number of suppliers reduces supply, then

Decrease in **supply**
⇒ Increase in **equilibrium** price
⇒ Decrease in **quantity demanded**

or shift supply left ⇒ price up ⇒ movement demand curve.

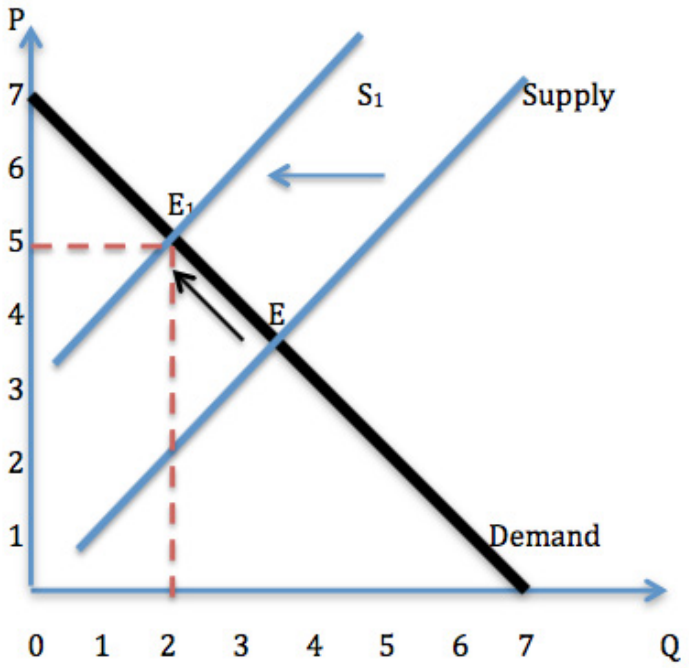


Figure 20: decrease in supply

7.6 Different market structures

In the previous section I assumed that markets are competitive and free from external interventions. I shall now explore different market structures, different sets of market conditions under which firms operate. In this section I shall define two extreme market structures: the perfectly competitive market and the imperfectly competitive market.

7.7 PC: Perfect Competition

Perfect competition is a useful theoretical concept but, in real life, you will never find a market with perfect competition. It is a market structure that is best understood by its assumptions. A *perfectly competitive market* is a market that is characterised by the following conditions:

- A large number of small firms operate as sellers in the market.
- There is free entry to the market.
- There is easy exit from the market.
- Sellers are *price takers*. This means they are too small in relation to the size of the market to influence the price. A seller must either accept the market price or exit from the market. Such sellers are said to 'meet TINA' because **T**here **I**s **N**o **A**lternative.
- Firms sell *homogeneous products*, products that are either identical or so similar that buyers are indifferent as to which one they buy.
- All actors in the market are perfectly well informed. Information about the products is free and readily available to every buyer and every seller.

No market satisfies all these assumptions; *nothing in life is perfect*; there is no such thing as perfect competition. The market that comes closest to being perfectly competitive is probably the market for agriculture produce. This market is used in economics as a benchmark to compare real market structures and assess how far they are from being perfectly competitive.

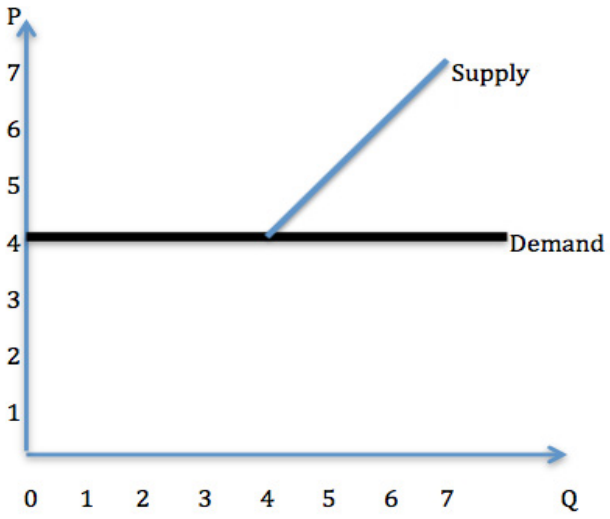


Figure 21: perfect competition

As you can see from Figure 21, an individual firm in a perfectly competitive market faces a horizontal demand curve. Each firm is a price taker, it is too small to affect the price, so the demand is equal to the market price. At that price, each individual firm can sell as much of its product as it wants. This also means that demand is perfectly elastic, if a firm increased its price by even the smallest amount, it would sell none of its product.

The blue line in Figure 21 is a supply curve in a perfect market. Sellers will continue to supply some of their products only as long as the market price allows them to make a profit. Therefore the supply curve is depicted as starting at the market price, the price that each seller has to take.

7.8 IC: imperfect competition

Just as a PC market structure is characterised by meeting a list of assumptions, an IC market structure is characterised by doing the opposite. There are several forms of imperfect competition, notably a *monopoly*, which displays the following characteristics:

- Only one firm acts as a seller in this market.
- There are barriers to entry. These may be natural, geographic, technological or legal barriers.
- The firm is a *price maker*, it sets the price of its own product.
- The firm is selling a unique product.
- Information about the product is not freely available.

Figure 22 illustrates the effect of a monopoly. It refers to marginal costs and marginal revenue, which I shall explain in detail in the next chapter.

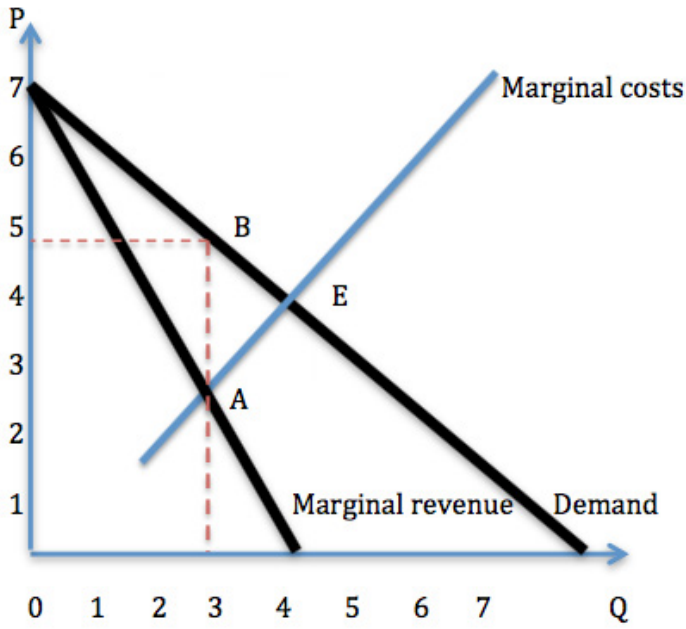


Figure 22: monopoly

In a monopoly, the firm applies the *Profit Maximising Rule*: it sets the quantity at Point A where the marginal cost is equal to the marginal revenue. It then uses its position as a price maker to set the *monopoly price* at Point B on the demand curve directly above Point A.

Point B (Q=3 & P=5) represents three units being sold at $5 each. Competition in this market would have resulted in four units being sold for $4 each which is represented by Point E (Q=4 & P=4).

There are several forms of imperfect competition.

Name	**Number of sellers**	**Name**	**Number of buyers**
Monopoly Natural Geographic Technological Government	one	Monopsony	one
Duopoly	two	Duopsony	two
Oligopoly	a few	Oligopsony	a few
Monopolistic competition	multiple firms offer variants of the same product or multiple products are offered, each with variations		

Barriers to entry define several types of monopoly. For example:

- A *natural monopoly* occurs when the type of industry makes it financially impractical, if not impossible, for multiple companies to engage in the business. For example, it would be practically impossible for more than one firm to supply water to a city. Each of the potential suppliers would need to build a water supply infrastructure, which would be financially and spatially unsustainable.
- A *geographic monopoly*, or *spatial monopoly*, occurs when there is only one company offering a particular good or service in an area. For example, it may financially unsustainable to operate more than one general store in a country town because of the small population size.
- A *technological monopoly* occurs when a good or service has legal protection in the form of a patent or copyright. For example, Apple has a patent to make and sell iPhones.
- A government can also form a monopoly when, for example, a certain company is given an exclusive license to provide a specific service on the government's behalf.

Questions

1. Describe in your own words what a marketplace is.
2. What is the market clearing price and quantity?
3. How is equilibrium in the market established?
4. Describe the causation chain when demand is increased.
5. Describe the causation chain when supply is decreased.
6. What are the assumptions that define perfect competition?
7. What are the assumptions that define a monopoly?
8. Which assumption of imperfect competition defines the different forms of monopoly?
9. Describe homogeneous products.
10. List the forms of monopoly.
11. List the forms of buyer-side imperfect competition.

8 The Fifth Principle: costs

8.1 Learning objectives

After studying this chapter you will know how to

- recognise **production factors** and a firm's production **costs**
- calculate **revenue, costs** and **profit**
- **illustrate different costs** on a graph

8.2 Production factors

If you have devised a new solution to a problem or invented a new product to make people's lives easier, I strongly encourage you to establish a business to make your dream a reality. You would then have demonstrated **entrepreneurial skills**, the most important factor in production. There are also other factors that will be essential to the success of your business. These factors, and their costs, will be covered is this section.

When establishing any business, there are three *factors of production* to consider in addition to entrepreneurship. They are **land**, **capital** and **labour**. You will need **land** for an office; you will need to raise **capital**; you will have to employ **people**. You will, of course, have to pay the price for each of these resources, you will have to bear the costs.

For **entrepreneurship**, the price is **profit**; for **land**, the price is **rent**; for **capital**, the price is **interest**; for **labour**, the price is **wages**.

8.3 Total costs

For the purposes of this discussion, I shall assume that you are dealing with a short term production run. A *short run* production is one where the short time frame means that some of the costs cannot be varied. For this example, I shall assume that the cost of land and the cost of capital are fixed for the duration of your production run. On the other hand, you can change cost of labour fairly quickly by hiring or laying off staff. Your **total costs** are **equal** to the **total fixed costs plus** the **total variable costs**:

$$TC = TFC + TVC$$

Total *fixed costs* are the costs that cannot be changed, regardless of the number of units produced. Total **fixed costs do not depend on output,** they must be paid even if your output is zero. For example, you have to pay the rent and make your interest payments regardless of your production levels.

For your firm to start and then to expand its production, you need to hire **labour** and pay their wages, and you need to buy **raw materials**. The costs related to all the **variable inputs**, the total *variable costs*, are in addition to the total fixed costs. As a manager, you can **control** these variable costs **by managing inputs**, by changing the level of production. An increase in production needs more of each of the variable inputs: labour, raw materials, electricity and so on. Table 6 is the schedule of short run costs for an imaginary firm.

Quantity	Fixed costs	Variable costs	Total
0	100	0	100
1	100	50	150
2	100	77	177
3	100	108	208
4	100	145	245
5	100	203	303
6	100	276	376
7	100	364	464
8	100	464	546
9	100	610	710
10	100	798	898

Table 6

This schedule can be illustrated on a graph showing the cost curves:

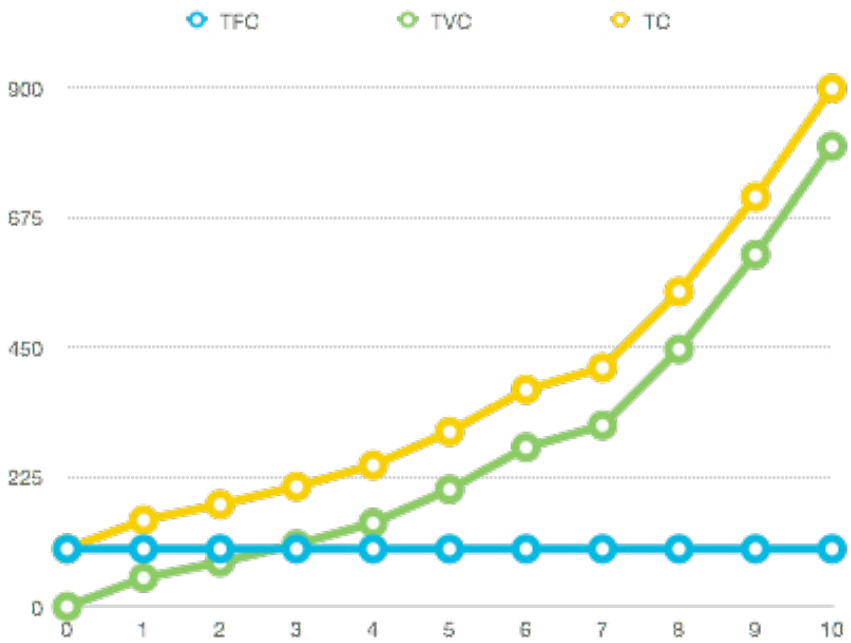


Figure 23: total costs

Questions

1. What is meant by a short run in economics?
2. What are the four factors of production?
3. List the price of each of these four factors of production.
4. If the output is zero, what are total costs equal to?
5. If variable costs are zero, what are the outputs equal to?
6. If fixed costs were \$78 when the level of output is 3, what would fixed costs be when the level of production is zero?
7. If variable and fixed costs amount to \$131 when the level of output is zero, what are the variable costs and what are the fixed costs?
8. When fixed costs for a zero output are \$16, what are the total costs and the variable costs?
9. If the level of production is 5, wage costs are \$5 and the total costs are \$150, what are the fixed costs?
10. Explain how you can control variable costs.

8.4 Average costs

If you are to manage production, you must be able to estimate the total cost per unit of production. There are three relevant figures here: average fixed cost, average variable cost and average total cost.

The *average fixed cost* is $\frac{\text{total fixed cost}}{\text{number of units produced}}$

$$AFC = \frac{TFC}{Q}.$$

The *average variable cost* is $\frac{\text{total variable cost}}{\text{number of units produced}}$

$$AVC = \frac{TVC}{Q}.$$

The *per-unit cost* or *average total cost* is $\frac{\text{total cost}}{\text{number of units produced}}$,

$$ATC = \frac{TC}{Q}.$$

As production expands, total fixed costs disperse over more units of output. They contribute less to the cost of each unit, average fixed costs are reduced and perunit costs are reduced. For example, if you are paying $100 in rent and interest, and you are producing 10 units of your product, the fixed costs are $100/10 = $10 per unit. If you increase production to 20 units, fixed costs are spread over 20 units and become $100/20 = $5 per unit.

8.5 Marginal costs

One of the most important concepts in microeconomics is the concept of marginal cost. In economics, *marginal* means extra or additional, so a marginal cost is an additional cost.

The *marginal cost of production* is $\frac{\text{change in total cost}}{\text{change in the quantity of output}}$,

$$MC = \frac{\Delta TC}{\Delta Q}.$$

In other words, the **marginal cost** of production is the **additional cost caused by each additional unit of production**. You need to calculate the **marginal cost** if you want to find the cost of increasing your output.

Quantity	Fixed costs	Variable costs	Total
0	100	0	100
1	100	50	150
2	100	77	177

Extract from Table 6

8.6 Example

Look again at the total costs in Table 6 above. Going from zero to one unit of output there is an increase of $50 from $100 to $150. In that case the marginal cost of the first unit of output is $50:

$$MC = \frac{\Delta TC}{\Delta Q} = \frac{\$150 - \$100}{1 - 0} = \$50;$$

the marginal cost of production going from one to two units is

$$MC = \frac{\Delta TC}{\Delta Q} = \frac{\$177 - \$150}{2 - 1} = \$27;$$

and so on, as shown in Table 7 below.

I have expanded this table to include the average costs as well as the marginal costs because there is an important **relationship** between **marginal and average** costs that I shall explain in the next section.

Quantity **Q**	Total Fixed Costs **TFC**	Total Variable Costs **TVC**	Total Costs **TC**	Marginal Cost **MC**	Average Fixed Cost **AFC**	Average Variable Cost **AVC**	Average Total Cost **ATC**
0	100	0	100				
1	100	50	150	50	100	50	150
2	100	77	177	27	50	38.5	88.5
3	100	108	208	31	33.3	36	69.3
4	100	145	245	37	25	36.25	61.2
5	100	203	303	58	20	40.6	60.6
6	100	276	376	73	16.6	46	62.7
7	100	364	464	88	14.2	52	66.3
8	100	464	564	100	12.5	58	70.5
9	100	610	710	146	11.1	67.8	78.9
10	100	798	898	188	10	79.8	89.8

Table 7: marginal and average costs

8.7 Marginal and average costs

Marginal and average costs are connected by the Marginal-Average Rule. To explain this rule, I must first plot the figures from Table 7 on a graph:

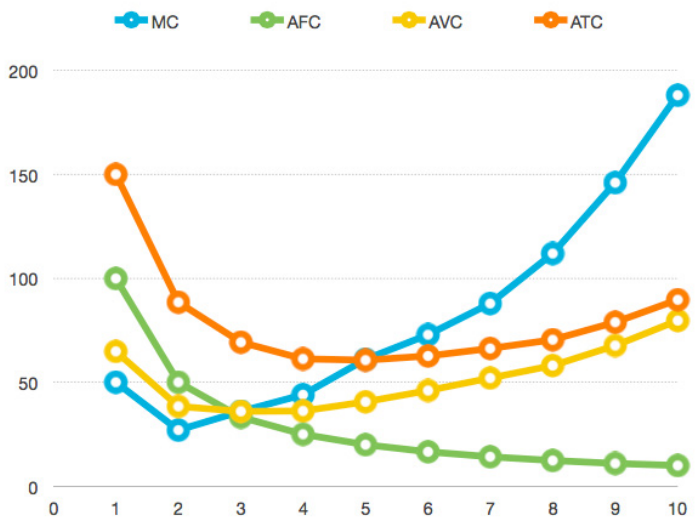


Figure 24: the Marginal-Average Rule

This graph makes several points clear. The curve for **marginal cost**, MC, first **decreases** until it reaches its **minimum point**, then it increases, making a shape that is something like the Nike trade mark. The curves for average variable cost, AVC, and average total cost, ATC, also decrease then increase, but they are smoother than the MC curve so they are more U-shaped.

The interesting observation to make here is that the **MC curve intersects** both the **AVC and ATC** curves at their **minimum points**. In addition, where the **marginal cost is less than the average variable cost**, the **average variable cost is decreasing**; where the **marginal cost is above the average variable cost**, the **average variable cost is increasing**. This is the *Marginal-Average Rule*.

MC < AVC ⇒ AVC decreasing

MC > AVC ⇒ AVC increasing

An example will make this clearer.

Suppose the average height of the members of your sports team is 170 cm. One day an extra player joins your team whose height is 165 cm. The average height of the team has now been dragged down by this extra, shorter player. Conversely, if the extra player is 185 cm tall, the average height will be pulled up.

Your Turn 1

Using what you have learnt, calculate the missing values and complete the following table:

Q	TFC	TVC	TC	MC	AFC	AVC	ATC
0	-	0.0	10.0				
1	-	-	-	5.0	10.0	5.0	-
2	-	-	17.0	-	5.0	-	-
3	-	11.0	-	-	-	3.7	7.0
4	-	16.0	-	5.0	2.5	-	-
5	-	-	33.0	-	-	4.6	6.6
6	-	-	41.0	-	1.7	5.2	-
7	-	42.0	-	11.0	-	-	7.4
8	-	-	68.0	-	1.3	7.3	-
9	-	90.0	-	32.0	-	-	11.1
10	-	-	143.0	-	1.0	-	14.3

Aside

I once called this exercise 'Sudoku' to my students. The following day one student, who had not attended that class, heard that we were doing Sudoku and came to my office. He said, 'Sir, I couldn't find any Sudoku in the textbook to practice for the assignment so I did a few Sudoku from the newspaper. Is that OK?'

Further discussion

The Profit Maximising Rule

The reason for learning about costs is to find ways to minimise them and to maximise profits. The **Profit Maximising Rule** is used to find the specific level of production that will maximise profit or minimise costs.

There are two ways to find out about the profit-maximising quantity of output. The first is to find the maximum difference between the total costs and the total revenue.

$$\text{Profit} = TC - TR$$

and *TR* is found by multiplying the unit price and the number of units:

$$TR = P \times Q$$

Another way of finding the profit-maximising level of production is to apply *marginal analysis*: find the quantity of output at which the **marginal cost** is **equal** to the **marginal revenue**. This is the *Profit Maximising Rule.* It states:

Profit is at the maximum when
the marginal cost of production is equal to the marginal revenue.

$MC = MR \Rightarrow$ max profit

The Profit Maximising Rule applies to firms in every market structure. Regardless of the market structure, a firm will set its quantity of output so that the marginal cost is equal to the marginal revenue in order to maximise its profits.

Reminder

You have seen the Profit Maximising Rule before, in The Fourth Principle. In Figure 22 you saw that a firm with a monopoly would set the quantity at the level where MC=MR, and then increases the price to meet the demand curve. A firm in a perfectly competitive market will also set the quantity of output where MC=MR. This case was illustrated in Figure 21. When there is perfect competition, the MC curve coincides with the part of the supply curve above the demand curve, and the MR curve coincides with the demand curve.

Remember

When you calculate a marginal value, you divide a change in total value by a change in quantity, and express the result as a fraction or a ratio. This applies to marginal cost, marginal revenue, marginal utility, marginal return or any other marginal value.

For example, if you know the total revenue, you can calculate the **marginal revenue** by **dividing the change in total revenue** by the **change in quantity**

$$\textit{Marginal revenue} \text{ is } \frac{\text{change in total revenue}}{\text{change in the quantity of output}},$$

$$MC = \frac{\Delta TR}{\Delta Q}.$$

Example

Table 7 above was the cost schedule for an imaginary firm in a perfectly competitive market. I shall assume that the price of this firm's product is $11.20 and calculate the total and marginal revenues:

Q	TC	AC	MC	TR	MR	Profit
10	100.50	10.50		112.00		11.50
12	111.50	9.29	5.50	134.40	11.20	22.90
14	124.50	8.89	6.50	156.80	11.20	32.30
16	140.50	8.78	8.00	179.20	11.20	38.70
18	**162.50**	**9.02**	**11.00**	**201.60**	**11.20**	**39.1**
20	202.50	10.13	20.00	224.00	11.20	21.50

Table 8

From the Table 8, you can see that the marginal cost is approximatley equal to the marginal revenue when the quantity is 18 units. Applying the Profit Maximising Rule, this firm will set its production level at about 18 units. With that quantity of output it will maximise its profit.

Your Turn 2

Complete a revised version of Table 8, this time assuming that the price is $8.80 per unit:

Q	TC	AC	MC	TR	MR	Profit
10	100.50	10.50				
12	111.50	9.29	5.50			
14	124.50	8.89	6.50			
16	140.50	8.78	8.00			
18	162.50	9.02	11.00			
20	202.50	10.13	20.00			

Table 8 revised

Part 3

9 Instead of a conclusion

This book is the result of many decades of international teaching experience in which I have challenged the accepted convention that economics cannot be explained in simple, layman's language. In this book I have presented, in simple terms, the core of the most difficult and the most important principles of microeconomics.

I have taught economics for more than two decades all over the world. In each country, with its distinct culture, customs and languages, my teaching philosophy has been the same: use simplicity, honesty, humour and show respect for differences in the learning styles of students.

This book offers a straightforward answer to the question 'why have economics subjects attracted such negative responses from students?' The principles of economic theory have to be explained in terms of everyday activities. Everyday activities are, after all, what economics is all about! Yes, every day we use complicated economic laws without even noticing.

Having studied this book, you are well set for further exploration of the subject and prepared to understand more substantial economics texts. This book should be the hook to get you to appreciate something that is useful in everyday life and, at the same time, is very simple: economics. Once hooked, you will be a more informed citizen, you will understand what all those serious-looking experts and politicians are talking about.

If, after reading this book, you realise how simple economics can be, and you decide to keep exploring the subject or even to become an economist, then the mission of the book has been accomplished.

10 About the author

Hazbo Skoko, MCM, MSc, PhD

Hazbo holds a doctorate in IT and ICT management, a masters degree in information economics, and a masters degree in international business management. His professional, commercial, research and teaching experience includes work in many countries including Austria, Montenegro, Serbia, Croatia, Macedonia, Germany, Sweden, Canada, China, Malaysia, Hong Kong, Cambodia, Slovenia, France, the UK, New Zealand, the US, Saudi Arabia, Ethiopia, Ghana and Australia.

His research interests include IT and ICT management, international business, information economics, quantum physics, complex systems and systemic approach applications. He has written four (three single author and one co-author) books and a number of articles in international journals.

Besides working full-time at Charles Sturt University, he is a visiting professor or guest professor at several prime universities around the world. In 2011 the World Education Congress Asia Award awarded him the 'Best Professor in Economics' award for teaching, integrity and leadership.

In his spare time he paints, plays saxophone, and writes short stories and scripts. He is also a very keen jogger, having run half marathons or full marathons in New York, London, Berlin, Chicago, Sydney, Canberra and elsewhere.

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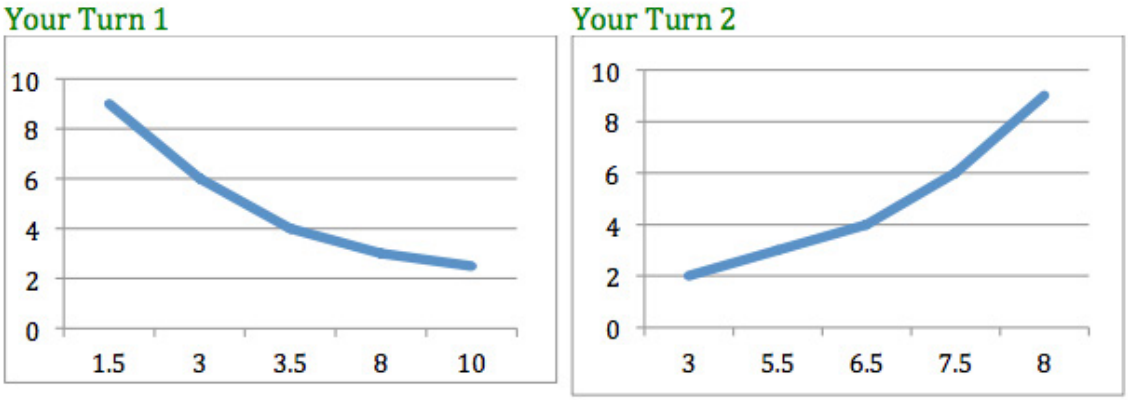
12 Selected answers

12.1 Those two lines



Questions

1. The simplest definition of economics is that it is a scientific discipline about our everyday rational activities. Another explanation is that economics is a discipline that is explains the rational behaviour of a typical person or a firm.
2. A negative or inverse relationship
3. Opposite. Because, as in life, in economics too everything has an opposite side.
4. a) 1; b) 3; c) 2

12.2 The First Principle

Questions

1. The opportunity cost of reading for one hour is the income you sacrificed, which is $100.
2. Commodity B
3. $300; 3 hours
4. B
5. A
6. One additional Product A
7. One less Product B
8. Five of Product B. To have five Product A, you to sacrifice five Product B. When you increase units on one axis you have to decrease units on another axis. In this case an increase of five units on the A axis results in a five unit decrease on the B axis.

Case 1

a) A new hospital
b) A new hospital
c) A new hospital
d) A new hospital

Case 2

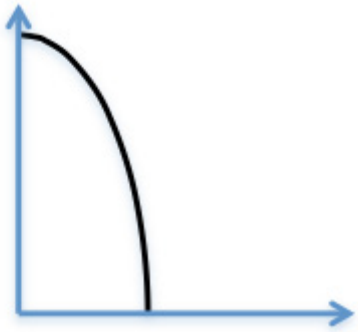
a) An hour of sleep
b) An hour of sleep
c) An hour of sleep
d) An hour of sleep

1 esaC

a) A navy ship
b) A navy ship
c) A navy ship
d) A navy ship

Challenge

In the case of increasing opportunity costs the shape of the black line would be an outward bowing curve, more or less as illustrated here:



For further explanation, watch the YouTube video at
https://www.youtube.com/watch?v=00fgAG6VrRQ

12.3 The Second Principle

Questions

1. $4
2. 4
3. 7
4. 0
5. Changes in the quantity demanded were caused by changes in the price of the product, and this is illustrated by movement along the demand curve.
6. Changes in the quantity demanded are caused by the changes in price of the product itself.
7. Up and downward movements along the demand curve were caused by the changes in the price of the product itself.
8. Movement along the demand curve is caused by changes in the price of the product itself. The shift may be caused by any other non-price factor.
9. Weather as a non-price factor would shift the demand curve.
10. Movement along the demand curve.
11. Income limitation, as a non-price factor, would be illustrated by a shift of the demand curve.
12. Changes in the price of the product itself.
13. The difference is in the influencing factors:

- Changes in demand are caused by non-price factors. These are illustrated by shifts on the demand curve.
- Changes in the quantity demanded are caused by changes in the price of the product, and this is illustrated by the movement along the demand curve.

14. It means 'change'.
15. Non-price factors
16. Changes in the quantity supplied are caused by changes in the price of the product itself, and this is illustrated by the movement along the supply curve.
17. Changes in the quantity supplied are caused by the changes in prices of the product itself.
18. Upward and downward movements along the supply curve are caused by changes in the price of the product itself.

Challenge

No, you cannot illustrate both changes on the curve at one time.

Your Turn

12.4 The Third Principle

Questions

1. Elasticity of demand is a measure of sensitivity of the quantity demanded to changes in the price. Similar statements apply to elasticity of supply and elasticity of income.
2. Price elasticity of demand is a ratio. If the numerator is larger than the denominator, the ratio is greater than one, which means that the relationship is positive.
3. Price elasticity of demand is a ratio. Unit elasticity arises when the numerator equals the denominator, the ratio is then equal to one.
4. Because demand shows the negative relationship between price and quantity
5. If the price elasticity of demand is 3, it means that for each 1% increase in price there is a 3% decrease in the quantity demanded.
6. If the price elasticity of supply is 3, it means that for each 1% increase in price there is a 3% increase in the quantity supplied.
7. If the income elasticity is 3, it means that for each 1% increase in income there is a 3% increase in the quantity demanded.
8. We can conclude that these two products are substitutes.
9. We can conclude that these two products are complements.
10. The difference between price elasticity of demand and price elasticity of supply is a + or – sign on the ratio. Since demand has a negative relationship between quantity and price, price elasticity of demand has a negative sign (which is later dropped). In contrast, supply has a positive relationship between price and quantity; price elasticity of supply is always positive.

12.5 The Fourth Principle

Questions

1. Markets are places where buyers and sellers meet to negotiate and arrive at the market clearing price and quantity.
2. The price at which demand and supply are equal and the inventory is cleared.
3. The equilibrium point is where demand is equal to supply. It is established when negotiations between buyers and sellers settle on the market clearing price and quantity.
4. Increase in demand, a rightward shift of the demand curve ⇒ Increase in equilibrium price ⇒ Increase in quantity supplied, an upward movement along the supply curve.
5. Decrease in supply, leftward shift ⇒ Increase in equilibrium price ⇒ Decrease in quantity demanded, upward movement along the demand curve.
6. PC is defined by:
   - a large number of small firms that act as sellers;
   - free entry to this market and easy exit from it;
   - sellers are price takers;
   - firms are selling homogeneous products, similar or even identical products, so buyers are indifferent as to which seller's product they buy;
   - all participants are perfectly well informed.

7. A monopoly is defined by:
   - single seller;
   - barriers to entry into the market;
   - the firm is the price maker;
   - the firm is selling unique products,
   - there is imperfect information in the market.

8. The assumption that defines different forms of monopoly is 'barriers to entry into the market'. Different barriers define different forms of monopoly: natural, geographic, technological and government legislated.
9. Homogeneous products are similar or even identical products that make buyers indifferent as to which seller's product they buy.
10. Some forms of monopoly: natural, geographic, technological and government legislated
11. Forms of imperfect competition on the buyers side are:
    - Monopsony
    - Duopsony
    - Oligopsony

12.6 The Fifth Principle

Questions

1. A short period of time in which variable production factors can be changed
2. Entrepreneurship, land, capital and labour.
3. For entrepreneurship, the price is profit; for land, the price is rent; for capital, the price is interest; for labour, the price is wages.
4. If the output is zero, the total costs are equal to the fixed costs.
5. If variable costs are zero, the output is equal to zero.
6. If fixed costs were \$78 when the level of output is 3, the fixed costs for zero production will also be \$78
7. If variable and fixed costs amount to \$131 when the level of output is zero, the variable costs are \$0 and the fixed costs are \$131.
8. When fixed costs for a zero output are \$16, total costs are \$16 and variable costs are \$0.
9. If the level of production is 5, total costs \$150 and wages \$5, then fixed costs are \$125.
10. Variable costs can be controlled by varying variable inputs.

Your Turn 1

Q	TFC	TVC	TC	MC	AFC	AVC	ATC
0	10	0	10				
1	10	5	15	5	10.0	5.0	15.0
2	10	7	17	2	5.0	3.5	8.5
3	10	11	21	4	3.3	3.7	7.0
4	10	16	26	5	2.5	4.0	6.5
5	10	23	33	7	2.0	4.6	6.6
6	10	31	41	8	1.7	5.2	6.8
7	10	42	52	11	1.4	6.0	7.4
8	10	58	68	16	1.3	7.3	8.5
9	10	90	100	32	1.1	10.0	11.1
10	10	133	143	43	1.0	13.3	14.3

Your Turn 2

Q	TC	AC	MC	TR	MR	Profit
10	100.50	10.50		88.00		-12.50
12	111.50	9.29	5.50	105.00	8.80	-5.90
14	124.50	8.89	6.50	123.20	8.80	-1.30
16	**140.50**	**8.78**	**8.00**	**140.80**	**8.80**	**0.30**
18	162.50	9.02	11.00	158.40	8.80	-4.10
20	202.50	10.13	20.00	176.00	8.80	-26.50

Profit maximising output at price $8.80 is16 units. Average costs at this output are $8.78, while marginal costs are approximately $8.

13 Glossary

Assumptions – set of preconditions for building an economic model

Ceteris Paribus – everything else held constant

Competition – market structure, set of market rules

Competitive market – a market structure in which there are a lot of buyers and suppliers

Costs – monetary outlays for products or services

Demand – wants, desires

Demand curve – a line showing inverse relationship between price and quantity

Economic Models – reduced economic reality

Economics – scientific discipline about how scarce resources are managed in the most efficient way. It is about the everyday activities of an typical rational person

Elasticity – response, reaction of quantity demanded to a price change

Equilibrium – balance, equality

Factors of production – necessary production inputs

Fixed costs – costs that do not change with the level of production

Geographic monopoly, or spatial monopoly – a firm that is the only supplier in a particular geographical area

Inverse (negative, opposite, indirect) relationship – a situation in which two variables are moving in opposite directions

Law of Demand – a rule which postulate that when the price is increasing the quantity demand is decreasing

Long run – a time frame in which all factors of production are variable

Marginal – extra, additional

Marginal analysis – The maximum profit can be calculated for each unit produced by deducting total cost from the total revenue. Another way of finding the profit-maximising level of production is to apply marginal analysis, that is, to find the quantity of output at which the marginal cost is equal to the marginal revenue.

Marginal-Average Rule – a rule that postulate where the marginal cost is less than the average variable cost, the average variable cost is decreasing; where the marginal cost is above the average variable cost, the average variable cost is increasing.

Market – place of trade negotiation between market forces

Market clearing price – a price at which demand and supply are equal

Market clearing quantity – a quantity at which demand and supply are equal

Market forces – demand and supply

Monopoly – a firm that is the only supplier of a certain product

Monopoly price – a price set by a monopolist

Movement along the demand (supply) curve – illustrate the price change impact on quantity demanded (supplied)

Natural monopoly – occurs when the type of industry makes it financially impractical for multiple companies to engage in the business

Non-price factors – all other factors apart from price that can affect an economic category

Opportunity (implicit) costs – the result of trade-offs, which are the results of scarcity; costs of missed opportunity

Perfectly competitive market – an imaginary concept used as a benchmark to help define a distance a market is away from a perfectly competitive market

Positive (direct) relationship – a situation in which two variables are moving in the same direction

Price maker – a monopoly firm that has a market power to set the price

Product – the production, output, or result of the production process

Production possibility frontier – an economic model which illustrates how much is possible to produce with given resources

Profit Maximising Rule – a rule that postulate that a firm to maximize profit should set up the production where marginal costs are equal to marginal revenue

Scarcity – shortage or limitations of resources

Service – intangible output of productive activity

Shift of a curve – illustrate the impact of non-price factors on a demand or supply curve

Short run – a time frame in which at least one factor of production is fixed

Substitutes – similar products that can be replaced by each other

Supply – availability of products or services

Supply curve – a line showing direct relationship between price and quantity

Technological monopoly – a monopoly established by a protected patented technological invention or discovery

The Law of Supply – a rule which postulate that when the price is increasing the quantity supplied is increasing

Theory – set of testable arguments

Trade-off – the result of scarcity; the necessity to make a choice

Utility – satisfaction (This is *not* the same as usefulness.)

Variable costs – changeable costs with the level of production

Vice versa – the other way around

14 Endnotes

1. I am intentionally using different words for the same thing: graph, figure or diagram. This is so you will not be so confused later when you see the same thing called differently by different authors.
2. By the way, I could choose the combination of products represented by Point J (A=3 & B=3) but it would not an optimal choice for me. Why would I chose that combination when I could have more products by choosing the combination at Point F or Point G?
3. As earlier, this firm could produce combinations of three Product A and three Product B (Point J), but it would not be an efficient use of the available resources. The most efficient use of resources is when the production is illustrated by one of the combinations represented on the black line.
4. I have restricting my discussion to the example of bottled water for the sake of simplicity. In reality, the arguments may not apply in this case but they will apply to many other products and services.
5. I have restricting my discussion to the example of bottled water for the sake of simplicity. In reality, the arguments may not apply in this case but they will apply to many other products and services.
6. A percentage is calculated from a ratio of two values with the same unit of measure. Because the units are the same, they cancel out and give you a unit-less measure.
7. In everyday speech, you may refer to 'goods and services'. In their technical writing, economists will also refer to 'a good' or 'a service' when there is only one.
8. I have avoided labelling any point as D because I shall be using D to denote the quantity demanded.