



the processing companies would not want proportionately more coffee as their production targets would already have been set and they have no use for further inputs, regardless of the price.

On the other hand, demand for manufactured goods tends to be more elastic, as there are usually many more substitutes available to consumers, since the product can be differentiated by different producers. This ties in with the determinant of PED mentioned earlier – “the number and closeness of substitutes”. For example, if the price of one branded vacuum cleaner increases significantly, consumers have the option of many other brands and will be likely to switch their purchasing to one of those. For most consumer goods, there are many ways that producers can differentiate their products, giving consumers lots of choice.



Processing coffee beans

What is income elasticity of demand (YED) and how do we measure it?

Income elasticity of demand is a measure of how much the demand for a product changes when there is a change in the consumer’s income. It is usually calculated by using the equation below:

$$YED = \frac{\text{Percentage change in quantity demanded of the product}}{\text{Percentage change in income of the consumer}}$$

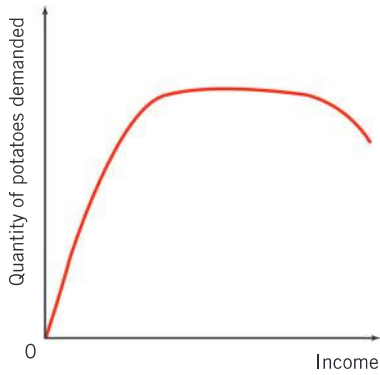
Take an example. A person has an increase in annual income from \$60,000 per year to \$66,000. She then increases her annual spending on holidays from \$2,500 to \$3,000. With this information, we can calculate her income elasticity of demand for holidays.

1. Her income has risen by \$6,000 from an original income of \$60,000, which is a change of +10%. This is calculated by the equation $\frac{+6,000}{60,000} \times 100 = +10\%$.
2. The quantity demanded of holidays has increased by \$500 from an original demand of \$2,500, which is a change of +20%. This is calculated by the equation $\frac{+500}{2,500} \times 100 = +20\%$.
3. If we put the two values above into the equation for PED, we get +20%/+10%, which gives a value of 2.

What is the range of values for income elasticity of demand?

In YED, the sign obtained from the equation (ie whether it is positive or negative) is important. The sign of YED tells us whether the product we are looking at is a normal good or an inferior good.

Remember that the demand for a normal good rises as income rises and the demand for an inferior good falls as income rises.



▲ **Figure 4.8** An Engel Curve showing the relationship between income and the demand for potatoes

Exercise 4.7

ATL Thinking and Communication

A consumer had an increase in income, following a salary rise, from \$80,000 per year to \$100,000 per year. In the following year, her expenditure on holidays increased from \$8,000 to \$10,000, her expenditure on gym membership remained the same, and her expenditure on locally produced clothes fell from \$2,000 to \$1,500.

1. Calculate her income elasticity of demand for holidays.
2. Explain what the value of her income elasticity of demand for holidays means.
3. Calculate her income elasticity of demand for gym membership.
4. Explain what the value of her income elasticity of demand for gym membership means.
5. Calculate her income elasticity of demand for locally produced clothes.
6. Explain what the value of her income elasticity of demand for locally produced clothes means.

For normal goods, the value of YED is positive (ie the demand increases as income increases). If the percentage increase in quantity demanded is less than the percentage increase in income, then a YED value between zero and one is obtained and the demand is said to be income-inelastic.

If the percentage increase in quantity demanded is greater than the percentage increase in income, then a YED value greater than one is obtained and the demand is said to be income-elastic.

Necessity goods are products that have low income elasticity. The demand for them will change very little if income rises. For example, the demand for bread does not increase significantly as income rises, because people feel that they already have enough bread and so will not increase consumption significantly. Demand will be income-inelastic.

Superior goods are products that have high income elasticity. The demand for them changes significantly if income rises. As people have more income and have satisfied their needs, they begin to purchase products that are wants, ie non-essential, in greater number. For example, the demand for holidays in foreign countries is likely to be income-elastic.

For inferior goods, the value of YED is negative, because the demand decreases as income increases. People start to switch their expenditure from the inferior goods that they had been buying to superior goods, which they can now afford. For example, the demand for inexpensive jeans falls as income rises because people switch to buying branded jeans.

An Engel Curve shows the relationship between income and the demand for a product over time. It is named after Ernst Engel, a nineteenth-century German economist. Such a curve is shown in Figure 4.8. We can see that as the income in a country rises over time, the demand for potatoes may increase, then become constant, and then begin to fall as people begin to buy superior products instead, such as pasta.

What do YED values mean?

Type of good	YED value	Meaning
Inferior	$YED < 0$	A given increase in income will lead to a proportionately smaller fall in demand
Necessity	$0 < YED < 1$	A given increase in income will lead to a proportionately smaller increase in demand
Luxury	$YED > 1$	A given increase in income will lead to a proportionately larger increase in demand

▲ **Table 4.2** The meaning of YED values



Why is a knowledge of income elasticity of demand important?

1. For decision making by firms

A knowledge of YED can be useful for firms when they are planning which markets to enter and which products to sell. Products that have a high YED will see large increases in demand as income levels in a country rise and so their markets will grow quickly. The research department of a company will aim to be aware of the YED of their products and the changing incomes of their target consumers in order to make the most of the possible opportunities. For example, consider the market for smartphones; as incomes in a particular country are growing, there is likely to be a proportionately larger increase in the demand for smartphones. The producers of smartphones will look to expand their sales in rapidly growing economies to take advantage of rising incomes.

As you are probably aware, producers often manufacture several versions of their product in order to appeal to consumers of different incomes. They also want to be able to take advantage of their knowledge of changing incomes to increase production of certain products and decrease production of others. If a country is expected to go into a recession, where national income (GNP) is actually falling, then producers will want to increase their production of inferior goods, whose demand increases as incomes fall.

2. For explaining sectoral changes in the structure of the economy

Production in economies is usually separated into three sectors:

- Primary sector – this consists of agricultural and fishing industries and extraction industries such as forestry and mining. Their products are known as primary products.
- Secondary (manufacturing) sector – these are industries that take primary products (raw materials) from the primary sector and use them to manufacture producer goods, such as machinery or consumer goods such as electronic goods or clothing. The secondary sector also includes the construction industry.
- Tertiary (service) sector – these are industries that produce services or intangible products, such as financial services, education, information technology and mass media to name just a few.

Sectoral change refers to the shift in the relative share of national output and employment that is attributed to each of the production sectors as an economy develops over time.

As countries grow and living standards improve, there is a change in the proportion of the economy that is produced in each sector. This does not mean that any sector is getting smaller, just that the relative proportion of output coming from this sector is likely to change. This may be explained using YED. As an economy grows, and incomes increase, the demand for primary products, such as agricultural

Exercise 4.8

ATL Thinking and Communication

Orange, a computer manufacturer, produces a very basic laptop computer at a low price of \$300 but also produces a more sophisticated model at a price of \$2,500 (and many other models in between!). At the end of 2017, Orange had sold 10,000 of the low-priced laptop and 800 of the higher-priced model.

In 2018, the country experienced economic growth of 5%. This economic growth of 5% is equated with an increase in national income of 5%. At the end of 2018, Orange had sold 9,000 of the cheaper model, and 900 of the more expensive laptop.

1. Calculate the YED for each model.
2. What does the value of YED for each model signify?
3. What is Orange likely to do if economists predict a recession in the following year?

products, does not greatly increase, because they have income-inelastic demand. When incomes grow, people do not tend to buy many more agricultural products. So, the extra income tends to be spent on manufactured products, such as mobile phones and other electronics, that have income-elastic demand. It follows that output in the primary sector will be growing, but output in the secondary sector will be growing more quickly. So output may be growing in all sectors in the economy, but the proportions of the total product from each sector will change.

As a country develops further, the same YED explanation may be used to account for the growth of the service sector. As we know, services tend to have high YED and so, as income grows, there will be faster growth in this sector, reflecting the high YEDs. There will be high growth in industries such as entertainment, education and healthcare.

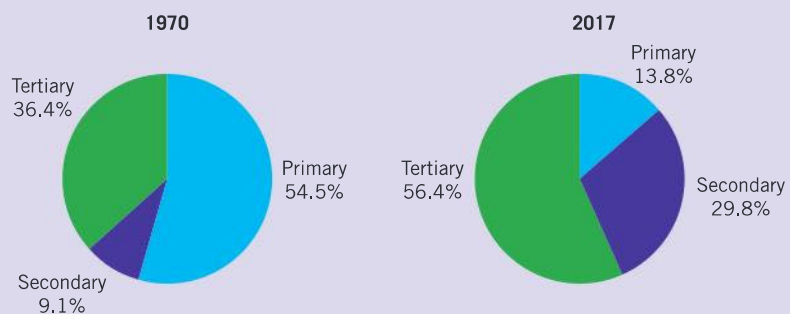
Therefore, the tertiary sectors of an economy tend to grow at a faster rate when a country grows, and the living standards of its populations increase, since the demand for tertiary products grows more rapidly.

It is worth noting that in our increasingly globalized world, where it is easier and easier to import goods and services from other countries, it is not necessarily the income of each individual country that determines how its own sectors may grow. It is more the case that global incomes are growing, leading to increased demand for manufactured goods and even greater increases in the demand for services from all different countries.

Exercise 4.9

ATL Thinking and Communication

The following data illustrate how the structure of the Bangladesh economy has changed since 1970. The three pieces of the pie indicate the amount of GDP generated from each of the three sectors.



Source: <https://data.worldbank.org/>

Using numbers from the charts in your explanation, comment on the changes that have occurred. How might income elasticity of demand have contributed to the change in the structure of the economy?



Assessment advice: Using the language of economics

Whenever you are discussing any type of elasticity in an examination question, you must try to be very precise with language. Elasticity measures the responsiveness of change, and it is the percentage change or proportionate change that is significant. Never say that a small change in price (or income) causes a large change in the quantity. Be specific – say that a given price change causes a proportionately smaller (or proportionately larger) change in quantity. Or say that a given percentage change in price leads to a smaller (or larger) percentage change in quantity. Or you could give values. For example, say that a 10% increase in price leads to a change in quantity that is greater (or less) than 10%. The adjectives “small” and “big” are just too imprecise.

EXAMINATION QUESTIONS

Paper 1, part (a) questions – HL & SL

1. Explain the determinants of price elasticity of demand. [10 marks]
2. A businessperson wants to increase her revenues. Explain why knowledge of price elasticity of demand would be useful. [10 marks]
3. Explain the concept of income elasticity of demand. [10 marks]
4. Using income elasticity of demand, explain the difference between normal, necessity and inferior goods. [10 marks]

Paper 1, full question – HL & SL

1. a) Explain the concept of elasticity of demand. [10 marks]
- b) Using real-world examples, discuss why it may be important for a firm to have knowledge of price elasticity of demand. [15 marks]