Supplementary material

The materials included here are not in the syllabus. Therefore, you will not be examined on them. They include, however, topics that may interest you in the event that you would like to expand your knowledge and understanding of economic ideas and principles.

Contents

Chapter 1, Section 1.2

Evaluating the free market economy and planned economy

Key advantages

The key advantages of the market economy include the following:

- **Automatic coordination of individual decisions: the invisible hand of the market**

  The market economy co-ordinates countless individual decisions in the absence of any central authority. In the free market system, the decisions of individual consumers, firms and resource owners are co-ordinated through their interactions in resource and product markets. There is no one managing or co-ordinating these decisions; the system is decentralised, and markets themselves are the organising principle of the economy. This decentralised co-ordination was termed '*the invisible hand*' of markets by one of the earliest economists, Adam Smith, in the 18th century.

- **Promotion of efficiency**

  The invisible hand means that society's well-being improves because of greater efficiency. This means that output is produced by use of the least amount of resources, while in addition resources are used to produce those goods and services that result in the greatest possible benefits for consumers. In brief, this means that the best possible allocation of resources results *from the point of view of what is in society's best interests*.

- **The pursuit of self-interest provides incentives that promote economic growth**

  When all private decision-makers (consumers, firms and resource owners) make decisions on the basis of what they believe to be in their best self-interest, this gives rise to incentives for hard work, risk-taking and innovation, which lead to higher levels of output and improved levels of living. The market system may therefore promote general welfare by advancing economic growth.

Key limitations

The market mechanism is an ideal type that does not and cannot ever exist in the real world. Its advantages noted above result from very strict, unrealistic conditions. When these conditions are not met, the market working on its own does not always produce results that are in society's best interests. The reasons are that:

- the market can fail to provide certain goods that are desirable, or can result in the production of some goods in smaller quantities than are socially desirable
- the market can end up producing certain activities that are socially undesirable (such as the polluting activities of many firms)
- large producers/sellers can limit competition, produce less output at higher cost, and sell thisoutput at higher prices than are socially desirable
- the market is unable to deal effectively with the issues of unemployment, inflation, and economic growth and development
- people in vulnerable social groups may receive very low or no income if they have few or no resources to sell, or if they are unable to work (i.e. sell their labour)
- the market may result in high and increasing income and wealth inequalities
- the market cannot operate effectively without a strong institutional and legal framework that must be established and enforced by the government, such as for example, the institution of private property and property rights.

Because of these shortcomings, governments intervene in the market with various policies in order to improve outcomes in favour of society's general well-being. We therefore never see a free market economy operating in the pure form described above. All the problems listed here require some form of government intervention that we will study in Chapters 4–7, 12–13, as well as most chapters of Unit 4.

Evaluating the planned economy

Like the ideal type of free market, the command economy as an ideal type described above has never existed in the real world, however it was approximated by communist countries during the 20th century, which relied heavily on central planning of most of their economic activities. Also, many non-communist less developed countries adopted some elements of central planning in the 1950s–1970s in the belief that this would promote more rapid growth and development (for example, India, Egypt and many countries in Africa, among others).

The development of central planning historically was prompted in part by a recognition of the disadvantages of markets, noted above, which tend to be even more pronounced in less developed countries. It was also associated with the ideological principle that the institution of private property goes

against the interests of the broader population. It was believed that certain objectives, such as rapid economic growth and development, would be better served through direct administration and government planning of economic activities. Another important objective was poverty alleviation through a more equal distribution of income, as well as provision by the government of important social services (health care, education) that would be widely distributed throughout the population.

However, centrally planned economies have run into serious difficulties:

- highly inefficient use of resources, due to the extreme technical difficulties involved in central planning of all economic activities, and its dependence on very detailed information that is essential for planning economic activities but that is not readily available
- absence of incentives for producers since they do not own resources (land and capital) and have no price system on which they can base their decisions
- excessive bureaucracy that interferes with achieving economic objectives effectively
- goods and services produced unlikely to reflect society's preferences as planners do not base their output decisions on what consumers want
- limited variety in the goods and services produced
- limited freedom of choice of all non-governmental economic decision-makers (consumers, producers).

Chapter 2, Section 2.2

The income and substitution effects in the case of inferior goods

If a good is *inferior*, income and the amount of the good purchased change in opposite directions. In this case as price falls and real income increases, quantity demanded of the good falls (examples of inferior goods are cheap substitute goods as discussed in the section of this chapter *Non-price determinants of demand*). The income effect and the substitution effects now work in opposite directions: as price falls quantity demanded increases due to the substitution effect, but it decreases due to the income effect. However, in the case of most inferior goods, *the substitution effect is larger than the income effect, therefore the net result of the two effects is the downward sloping demand curve: as price falls, quantity demanded increases.*

Very rarely, it is possible for the income effect of an inferior good to be larger than the substitution effect, in which case a price fall leads to a quantity decrease, and therefore an upward sloping demand curve. When this occurs the good is called a *Giffen good*. Giffen goods are extremely rare.

Chapter 4, Section 4.2

Tax incidence and price elasticities of demand and supply

When a good is taxed, part of the tax is paid by consumers and part by producers; therefore the tax burden is shared between the two. This is because compared to the pre-tax price, P^*, consumers pay a higher price ($P_c > P^*$) and producers receive a lower price ($P_p < P$). (See Figure 4.11(b) in the coursebook as well as the figures below.) But how is the tax burden shared between them? The burden of a tax is referred to as **tax incidence**. The distribution of the incidence, or who has a larger burden and who has a smaller burden, depends on the price elasticity of demand and price elasticity of supply for the good being taxed.

Incidence of indirect taxes and price elasticity of demand

The diagrams in Figure SM1 show how the burden of a specific tax is shared between consumers and producers. In part (a) demand is inelastic, whereas in part (b) it is elastic.

The full amount of tax is given by $(P_c - P_p) \times Q_t$, or the amount of tax per unit multiplied by the number of units sold; this is the entire shaded area, and is equal to the government's tax revenue. The incidence of the tax is partly on consumers and partly on producers:

$$\text{tax burden (incidence) of consumers} = (P_c - P^*) \times Q_t$$

$$\text{tax burden (incidence) of producers} = (P^* - P_p) \times \text{Qt}$$

When demand is inelastic, as in part (a), most of the tax incidence is on consumers; when demand is elastic, as in part (b), most of the incidence is on producers.

Comparing the two diagrams, we can also see that when demand is inelastic, there is a relatively small drop in equilibrium quantity compared with when demand is elastic, i.e. the decrease from Q^* to Q_t is smaller in part (a) compared with part (b). This is what we expect, since with inelastic demand ($0 < PED < 1$), quantity demanded is not very responsive to changes in price.

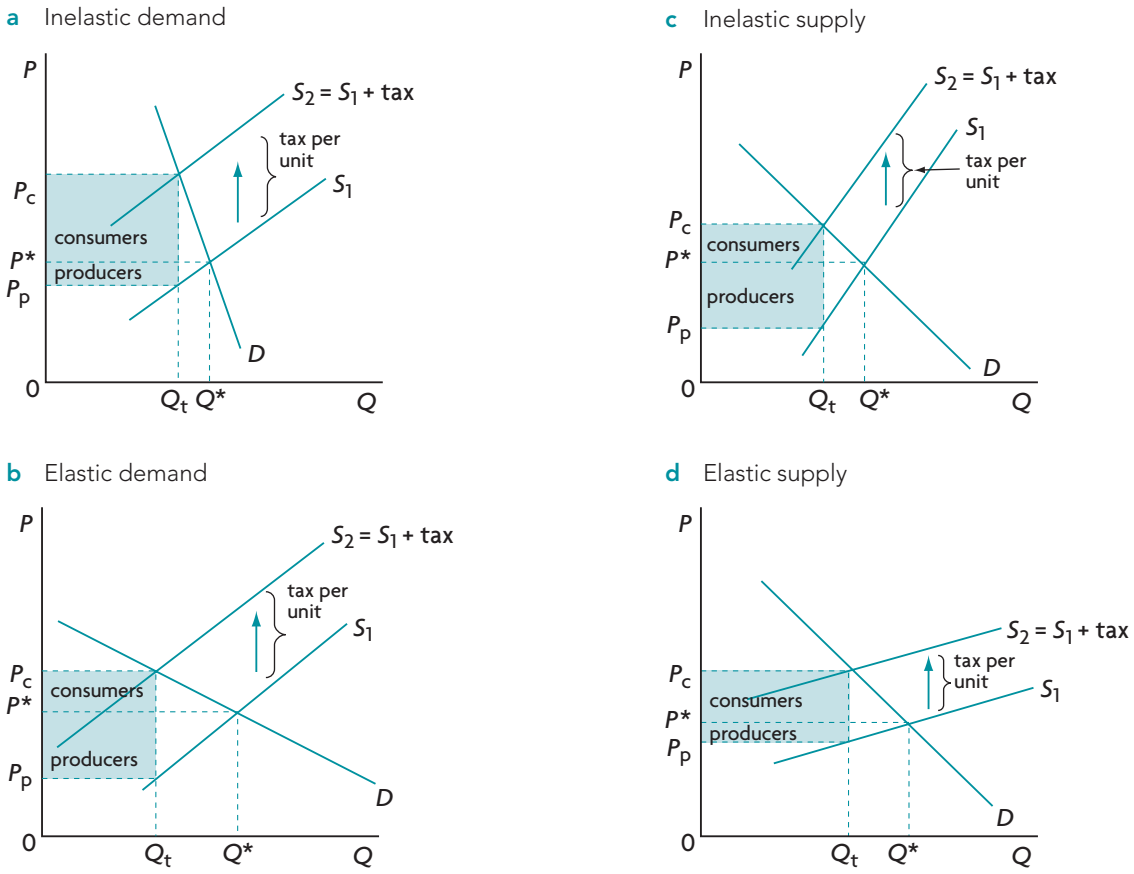


Figure SM1: Incidence of an indirect tax

Incidence of indirect taxes and price elasticity of supply

Part (c) shows inelastic supply and part (d) elastic supply.

When supply is inelastic, most of the tax incidence is on producers, whereas when supply is elastic, most of the tax incidence is on consumers.

Putting *PED* and *PES* together

There is a simple rule we can use to summarise the above points: *the group with the more inelastic response pays a higher share of the tax*.

Therefore, when *PES*>*PED*, the tax incidence is mainly on consumers. When *PED*>*PES*, the tax incidence is mainly on producers

The reason is that the tax burden falls proportionately more on the group whose activities are less responsive to price changes: on consumers whose purchases are not very responsive to price increases (inelastic demand), and on producers whose sales are not very responsive to price increases (inelastic supply). The low responsiveness (low price elasticities) means that as price increases due to the imposition of the tax, consumers or producers do not change their buying and selling activities substantially, and so as a result must bear a relatively larger portion of the tax burden.

Chapter 5, Section 5.4

A tax on producers or consumers?

You may be wondering why the tax to correct negative consumption externalities should affect producers, shifting the supply curve upward in Figure 5.9(a), and not consumers by shifting the demand curve downward, who after all are the ones creating the externality through consumption. In fact, *these two shifts produce identical market outcomes*.

We have seen in Figure 5.9(a) that when an indirect (excise) tax is imposed on the good causing the negative externality, the supply or *MPC* curve shifts upward. At the new equilibrium, Q_{opt} will be produced, and will be sold at the price P_c, which is the price paid by consumers, while the price received by producers is P_p.

If instead a tax per unit bought is imposed on consumers, which they pay directly to the

government, this would cause a downward shift of the demand curve, as in Figure SM2, from D_1 to D_2. The reason for this shift is that for each quantity consumers are willing and able to buy, the 'price' they pay includes the price of the good plus the tax per unit. This means that for each quantity, the price of the good must be lower by the amount of the tax.

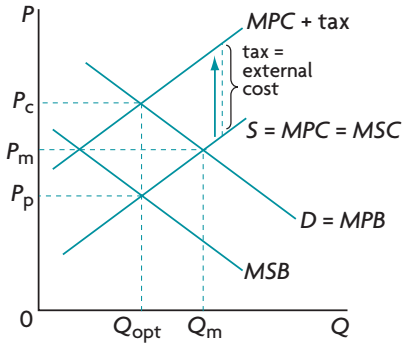


Figure SM2: Imposing an indirect tax on consumers

The new equilibrium is determined by the intersection of the new demand curve, D_2, with the supply curve (which has not been affected), giving rise to Q_{opt}. When consumers buy Q_{opt} quantity, they pay the tax per unit plus price P_p (determined by their demand D_2), making a total price of P_c. The price P_p is the price received by producers.

Comparing Figure 5.9(a) with Figure SM2 we see that the market outcomes are identical. Q_{opt} has been achieved, consumers pay price P_c, and producers receive price $P_p = P_c$ – tax. The only difference between the two situations is who pays the tax to the government. In practice, excise taxes on goods are paid to the government by firms, because it is administratively far easier for the government to collect taxes this way.

Chapter 7, Section 7.3

Perfect competition: moving from short-run equilibrium to long-run equilibrium

Figure SM3 illustrates the process by which firms end up earning normal profit in the long run.

Abnormal profit in the short run to normal profit in the long run

The initial industry equilibrium is shown in Figure SM3(b), with D and S_1 determining price P_1. Figure SM3(a) shows the corresponding firm equilibrium. P_1 is the price accepted by each firm, equal to the firm's MR, and by the $MC = MR$ rule, firms produce output Q_1 and earn abnormal profit equal to a – b per unit of output.

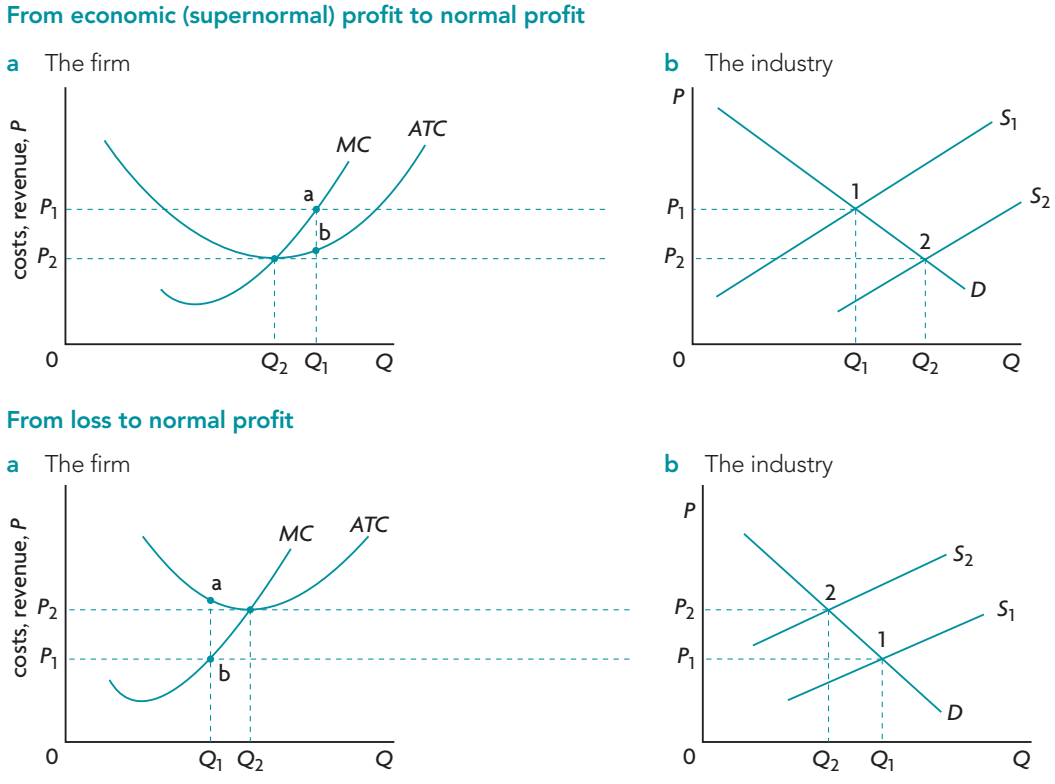


Figure SM3: From short-run equilibrium to long-run equilibrium in perfect competition

In the long run, the abnormal profit realised by firms in the industry leads to the entry of new firms attracted by the prospect of making abnormal profits. As new firms enter, the industry supply curve S_1 in Figure SM3(b) begins to shift to the right, and shifts until it reaches S_2, causing industry output to increase to Q_2 and the market price to fall to P_2. At P_2, the abnormal profits of the firms have fallen to zero, and all firms are earning normal profit where P = minimum AC.

Loss in the short run to normal profit in the long run

We now assume that firms begin from a short-run equilibrium position where they are making losses. The firm and industry positions are shown in Figure SM3(c) and (d). The demand curve D and supply curve S_1 determine P_1 that firms accept and which represents their MR. By the $MC = MR$ rule, firms minimise losses by producing Q_1. Loss per unit is equal to a – b.

Once they go into the long run and have no more fixed inputs, the firms are free to leave the industry. As some firms begin to exit, the industry supply curve begins to shift to the left from S_1 in Figure SM3(d), and shifts until it reaches S_2, determining price P_2. As the supply curve shifts and price rises, the remaining firms' losses get smaller and smaller until at P_2 the firms are no longer making losses. P_2 represents the firms' new MR, and by the $MC = MR$ rule, firms produce output Q_2 and earn normal profit (where P = minimum ATC).

Chapter 7, Section 7.7

Regulation of natural monopoly

Figure SM4 shows a natural monopoly; the demand curve intersects the AC curve before AC reaches its minimum, indicating that economies of scale have not been full exhausted. Using the $MC = MR$ rule, we find the unregulated monopoly produces Q_m output and sells it at price P_m, with economic profit per unit given by a – b. The government can step in to regulate this monopoly in two ways: through marginal cost pricing or average cost pricing.

Marginal cost pricing

The 'best' or optimal policy is to force the monopoly to charge a price equal to marginal cost, since with $P = MC$, the monopolist would achieve allocative efficiency. This is called *marginal cost pricing*, and is shown in Figure SM4, where the intersection of the demand (or AR) and MC curves give rise to price P_{mc} and to quantity Q_{mc}. You can see that Q_{mc} is larger than Q_m produced by the unregulated firm, and P_{mc} is lower than P_m charged by the unregulated firm. Marginal cost pricing forces an efficient allocation of resources, and quantity of the good produced increases to the socially desirable level.

However, marginal cost pricing leads to losses for the natural monopolist. The reason is that P_{mc} lies below the AC curve at the point of production, so price is too low to allow the firm to cover its average costs (loss per unit is given by d – c). As long as the demand curve cuts the AC curve to the left of minimum AC, as in a natural monopoly, it is not possible for the MC curve to cut the demand curve at a point above AC.

MC and AC

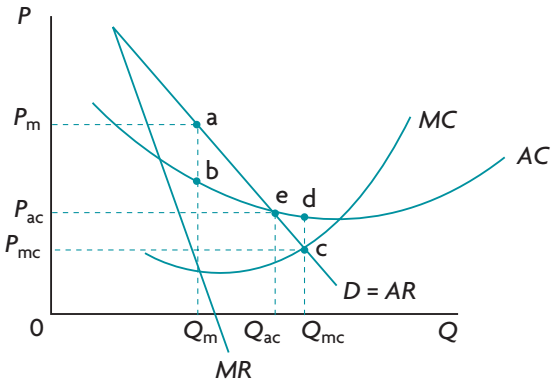


Figure SM4: Comparing regulated with unregulated natural monopoly: marginal cost pricing (*MC*) and average cost pricing (*AC*)

This means that marginal cost pricing will always lead to losses for the natural monopoly. (This need not occur in the standard monopoly diagrams representing a monopoly that is not a natural monopoly.)

Therefore, although marginal cost pricing leads to an efficient solution, it is impractical, as the losses forced on the monopolist would make it go out of business (shut down) in the long run.

Average cost pricing

To avoid creating losses for the natural monopolist, governments can force the firm to charge a price equal to its average total costs ($P = AC$). This is called *average cost pricing*. This price is determined by the intersection of the demand curve with the

AC curve, occurring at point e in Figure SM4, and giving rise to price P_{ac} and quantity Q_{ac}. Average cost pricing results in a higher price than marginal cost pricing ($P_{ac} > P_{mc}$) and a lower quantity ($Q_{ac} < Q_{mc}$), indicating that it is not as efficient as marginal cost pricing. However, it is far superior to the price–quantity combination achieved by the market for the unregulated monopoly, as you can see by comparing P_{ac} with P_m, and Q_{ac} with Q_m.

Average cost pricing is also known as *fair return pricing*, because the monopolist is forced to earn normal profit. You can see this by noting that when $P = AC$, the price is just enough to cover the firm's costs of production (explicit plus implicit costs). Therefore, the firm is no longer making a loss, and is no longer making a supernormal profit; it is simply earning normal profit.

Although allocative efficiency is not achieved through average cost pricing, this policy offers two very important advantages: (a) the monopolist makes normal profit and is not in danger of having to shut down; and (b) it is more efficient than the market solution.

Yet, average cost pricing also has disadvantages. A monopolist in a free, unregulated market faces incentives to keep its average costs low, in order to maximise profits. If through regulation it is guaranteed a price equal to its average costs, it loses this incentive. Even if average costs go up due to inefficiency, it will still receive a price covering its costs.

Another possible disadvantage is that the regulated monopoly may continue to survive as a monopoly, even though it may stop being a natural monopoly (if technological improvements change cost conditions, such as in telecommunications). Continued regulation provides protection to the firm from new competitors that would have been able to produce more efficiently.

Chapter 8, Section 8.2

The meaning of *gross* in *gross domestic product*

You may be wondering what the term 'gross' in 'gross domestic product' and 'gross national income' refers to. It is related to spending to produce capital. You may remember from Chapter 1 that physical capital, a produced factor of production, consists of buildings, equipment and machinery. All of these have a finite life; in other words, they do not last forever. Within any given year, some of the capital goods in an economy become worn out and are thrown away. This capital that gets worn out is called *depreciation*.

Each year, the worn-out capital goods must be replaced. This means that in any year, of the total new production of capital goods, a part goes to replace capital goods that have been thrown out and the rest are new additions of capital goods.

Investment, as we know, refers to spending by businesses on capital goods. Total investment is known as *gross investment*, and is divided into two parts:

- the part that goes toward replacing thrown-out capital goods (depreciation)
- the part that consists of new additions of capital goods, known as *net investment.*

To put it more simply:

gross investment = depreciation + net investment

total investment = worn-out capital goods + additions of new capital

In the expression for gross domestic product, $GDP = C+I+G+(X-M)$, I refers to gross (or total) investment. This is because GDP measures an economy's total output, and therefore includes total spending on capital goods, including replacements of depreciated capital and new additions to capital goods.

In an alternative way of measuring aggregate output, net investment is used to arrive at *net domestic product* (NDP):

NDP = C + In + G + X − M

where In = net investment. Therefore NDP = GDP − depreciation

Chapter 9, Section 9.1

The negative (downward) slope of the aggregate demand curve

In microeconomics, demand for a product shows what quantity *consumers* are willing and able to buy of a *single product* at different possible prices of that product, over a particular time period (*ceteris paribus*). In macroeconomics, aggregate demand shows what quantity of the economy's *aggregate output*, or total real GDP that *all possible buyers* (consumers, businesses, government and foreigners) are willing and able to buy, at different possible price levels, over a time period (*ceteris paribus*).

Moreover, in microeconomics, the horizontal axis measures *quantity of a single good*. This quantity has nothing whatever to do with consumers' incomes. In macroeconomics, the horizontal axis measures the quantity of total output, or real GDP of an economy, but real GDP, as we know from the circular flow model (Figure 8.1 in the coursebook), also represents the *total income* of an economy.

Further, in microeconomics, the demand curve is downward-sloping because of the diminishing marginal benefits that consumers derive as they consume more and more of a product (see Chapter 2, Section 2.5). In macroeconomics, the idea of diminishing marginal benefits does not come into play. Instead the reasons for the macroeconomic downward sloping demand curve include the following:

- **The wealth effect.** Changes in the price level affect the real value of people's wealth. (Wealth is the value of assets that people own, including their savings in their bank accounts, their houses, stocks and bonds, their jewellery, works of art, and so on.) If the price level increases, the real value of wealth falls. People feel worse off and cut back on their spending on goods and services. Therefore, as the price level increases, less output is demanded, leading to an upward movement along the *AD* curve.
- **The interest rate effect.** Changes in the price level affect rates of interest, which in turn affect aggregate demand. If there is an increase in the price level, consumers and firms need more money to carry out their purchases and transactions. This leads to an increase in the demand for money, which in turn leads to an increase in rates of interest.[1] As interest rates rise, the cost of borrowing increases leading to a decrease in consumer purchases, as well as in investment spending by firms which are financed by borrowing. Therefore, increases in the price level lead to a fall in quantity of output demanded, or an upward movement along the *AD* curve.
- **The international trade effect.** If the domestic price level increases while price levels in other countries remain the same, exports become more expensive to foreign buyers who now demand a smaller quantity of these. At the same time, goods produced in other countries become relatively cheaper, so domestic buyers increase their purchases (imports) from foreign countries. Therefore, a rising price level produces a fall in exports and a rise in imports so that net exports, $X - M$, fall. This represents a fall in quantity of output demanded or an upward movement along the *AD* curve.

A clarification

In connection with our discussion of the negative slope of the *AD* curve above, you should take care not to confuse the wealth effect, resulting from *a change in the price level* (causing a movement along the *AD* curve), with changes in wealth which cause shifts in the aggregate demand curve *for a given price level*. The first case refers to a change in *the real value of wealth that has resulted from a change in the price level*. The second case refers to a change in the real value of wealth *that has come about without any change in the price level*. The same must be said about the difference between the interest rate effect that results from a change in the price level (and produces movements along the *AD* curve), and changes in interest rates that occur without any change in the price level, hence causing shifts of the *AD* curve.

Chapter 10, Section 10.2

Comparing the CPI with the GDP deflator

In Chapter 8 of the coursebook, we learned that the GDP deflator measures the average level of prices of all goods and services included in GDP. It is in fact possible to measure the rate of inflation using the GDP deflator rather than the CPI. However, the rate of inflation calculated using the GDP deflator has a different meaning than when the CPI is used.

Rates of inflation derived from the consumer price index and from the GDP deflator follow the same general pattern, and tend to move in the same direction (both moving upward or downward), but they are not the same. The two price indices are based on prices of a different set of goods and services, and they also differ in how they measure price changes.

The consumer price index is based on *a fixed basket of goods and services, valued at prices that change over time*. The GDP deflator is based on *actual output produced that changes over time, valued at fixed, base*

[1] Interest rates can be thought of as the 'price' of money services. Using standard microeconomic analysis, we can see that as the demand for money increases, while the supply is constant, the interest rate rises. We will examine interest rates in Chapter 13.

year prices. It follows, then, that the GDP deflator does not face the problems of the CPI resulting from the CPI's use of a fixed basket (discussed earlier in Chapter 10), and as a result is a more accurate measure of changes in the overall price level, or rate of inflation.

Yet of the two measures, the CPI is the one used by governments and the private sector to estimate adjustments to nominal incomes needed to maintain their real value (such as workers' nominal wages, pensions, welfare payments, etc.). Also, central banks use the CPI as a guide to monetary policy (discussed in Chapter 13).

There are two main reasons why the CPI is preferred:

- *The GDP deflator includes irrelevant goods from the consumer's perspective and excludes imports*. The CPI measures price changes of goods and services bought by typical households, including those produced domestically as well as imports. The GDP deflator measures prices of all goods and services included in GDP (everything produced domestically), and therefore includes prices of exports, capital goods and goods purchased by the government, all of which are of no interest to consumer groups interested in keeping track of their real incomes (such as wage earners and pensioners). Also, the GDP deflator excludes prices of imports, which can be of great interest to consumers who buy imported goods (such as imported oil for home heating and car fuel purposes).

  Summing up, the CPI reflects changes in the cost of living for consumers; the GDP deflator reflects changes in average prices for the economy as a whole.

- *The GDP deflator does not allow goods and services to be weighted in accordance with their relative importance in the typical household's budget*. The use of a fixed basket of goods and services, to which particular weights are attached, offers an important advantage: it allows for the measurement of average price changes faced by the typical household. The weights attached to particular goods and services in the base year basket are in accordance with their relative importance in the typical household's budget. For example, the weights attached to food in the basket may be completely different from the relative importance (or weight) of food products in GDP. For the consumer, what matters is the relative importance of household spending on food, not the relative importance of food products in GDP.

Chapter 11, Section 11.1

Impact of economic growth on unemployment and inflation

Impact of economic growth on unemployment

To understand the effects of economic growth on unemployment, we must make a distinction between different types of unemployment, the key distinction being between cyclical and natural (of which structural is the most important). In addition, it is useful to make a distinction between short-term economic growth occurring in the expansionary phase of the business cycle, and long-term economic growth shown by increases in potential output.

Economic growth due to the expansionary phase of the business cycle affects *cyclical unemployment*, which as we know falls in an expansion (and increases in a contraction). If aggregate demand continues to increase beyond the full employment level of real GDP, leading to an inflationary gap, unemployment falls below the natural rate. However, this will only be temporary as government authorities are likely to step in with contractionary policies intended to close the inflationary gap and bring real GDP back toward its potential level with unemployment returning to the natural rate.

Therefore, economic growth due to the short-term fluctuations of the business cycle can mainly reduce (and possibly eliminate) cyclical unemployment, but with only a temporary impact on natural unemployment.

Sustained (not temporary) reductions in natural, and particularly structural, unemployment *may* result from long-term economic growth, involving increases in potential output, shown by rightward shifts in the *LRAS* or Keynesian *AS* curves. Increases in potential output are caused by supply-side factors, such as increases in resource quantities, improvements in resource quality, technological change, etc. However, not all increases in potential output lower natural unemployment. *In some situations increases in potential output may cause structural unemployment to increase.*

For example, economic growth may itself lead to increases in structural unemployment if growth results from technological changes leading to a fall in the demand for certain labour skills. In developing countries, growth could result from the introduction of inappropriate technologies (such as capital-intensive technologies), which would cause unemployment to rise.

Economic policies pursued by government can also work both ways, either increasing or reducing unemployment over the longer term. This topic will be discussed in Chapter 13, where we will see that certain supply-side policies such as labour market reforms or investments in human capital, can work to reduce structural unemployment. Other policies, however, such as privatisation, and trade and market liberalisation, may work to increase it.

It follows then, that long-term reductions in unemployment require economic growth, but not all economic growth results in lower unemployment. *While economic growth offers the potential to reduce unemployment, whether or not this will occur depends on the particular factors and policies that lead to growth.*

Impact of economic growth on inflation

As in the case of unemployment, it is useful to make a distinction between short-term economic growth due to the expansionary phase of the business cycle, and long-term economic growth or increases in potential output. In addition, the effects of growth on inflation depend partly on whether we use a monetarist/new classical or Keynesian approach.

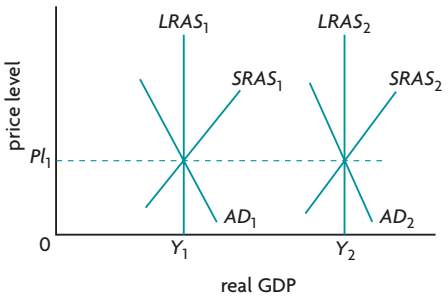
In the expansionary phase of the business cycle, as real GDP increases due to increases in aggregate demand, *the price level remains constant* in the Keynesian model because of spare capacity and the presence of unemployed resources in the economy; this involves real GDP increases along the horizontal part of the *AS* curve, as shown in Figure 9.13(b) in the coursebook. However, as real GDP approaches the level of potential output, resource bottlenecks begin to cause increases in resource prices which are passed on to consumers in the form of higher product prices. Continued aggregate demand increases beyond the level of potential output become highly inflationary.

In the new classical/monetarist model, an increase in aggregate demand always causes an increase in the price level, even if the economy is initially in recession (see Figure 9.7(a)); in the long run an increase in *AD* leads only to price level increases (see Figure 9.14(a)).

Therefore, while there is disagreement between the two models on what happens to the price level in a recession, *there is agreement between them that growth caused by increases in aggregate demand at about or beyond the level of potential output is inflationary.*

In addition, there is agreement between the two models that long-term economic growth, involving increases in potential output, work to reduce inflationary pressures. This can be seen clearly in Figure SM5, where increases in aggregate demand are matched by increases in the *LRAS* and *AS* curves respectively. With increases in the productive capacity of the economy due to economic growth, growth in aggregate demand can be easily met without causing upward pressures on the price level.

a The monetarist/new classical model



b The Keynesian model

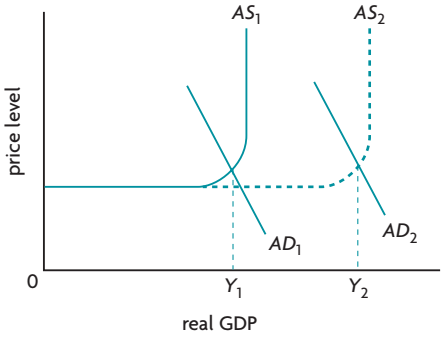


Figure SM5: Short-term and long-term growth with no inflationary pressure

Note that unemployment and inflation may also impact on economic growth.

- **Unemployment.** Economic growth may lower cyclical or structural unemployment, but reductions in unemployment can contribute to economic growth by making better use of available resources (movement closer to the economy's production possibilities curve or *PPC*)
- **Inflation.** Economic growth may contribute to a higher rate of inflation, but a high rate of inflation may contribute to lower economic growth, by discouraging investment and net exports (see Chapter 10)

Chapter 12, Section 12.5

Achieving progressivity through proportional taxation

Personal income taxes in most countries are progressive, though in some countries they are proportional (they are called 'flat taxes' or 'flat rate

taxes'). Examples include Estonia, Latvia, Lithuania. When personal income taxes are proportional, they can achieve some progressivity by introducing exclusions. An exclusion is an amount of income that is excluded from the tax. Assume a hypothetical tax system with an exclusion of £10000; this means that any income up to this amount is not taxed at all. Suppose that all incomes above this amount are taxed at 15% (proportional taxation). Table SM1 shows that addition of an exclusion to a proportional tax system makes it progressive. Taxable income is income minus the exclusion; the amount of tax is calculated as 15% of taxable income. The effective tax rate is found by dividing the amount of tax by the amount of income. Since the effective tax rate is increasing, the proportional tax system has become progressive.

Since all proportional income tax systems, where they have been implemented, contain exclusions, it follows that virtually all personal income tax systems around the world are in effect progressive, though they vary very much in how progressive they are.

Income £	Taxable income £	Amount of tax £ (= 15% of taxable income)	Effective tax rate
10000	0	0	0
15000	5000	750	5%
20000	10000	1500	7.5%
25000	15000	2250	9%

Table SM1: A proportional income tax becomes progressive when there are income exclusions

Chapter 13, Section 13.5

Further topics on the multiplier and Keynesian economic theory (recommended for HL)

The multiplier and fiscal policy

Fiscal policy and demand management

The effects of fiscal policy depend on the value of the multiplier. If the government increases G as part of an expansionary policy, the multiplier effect should lead to a larger increase *in real GDP*. How much larger depends on the multiplier, which in turn depends on the size of the marginal propensity to consume, *MPC*. The larger the *MPC*, the larger the size of the multiplier, and the greater is the expansionary impact of the government's increase in spending.

Since $MPC + MPS + MPT + MPM = 1$, a large *MPC* necessarily means that the leakages are small, and therefore the government's injection of spending will have a relatively large impact on real GDP. If, however, there is a high marginal propensity to import (*MPM*), then the *MPC* is correspondingly lower, and the value of the multiplier is also lower, reducing the impact on aggregate demand of the government's injection of spending. A large fraction of the additional income made possible by the government's increase in spending leaks out of the economy in the form of spending to buy imports, thereby reducing the impact in the domestic economy of the government's increase in spending.

An expansionary fiscal policy involving tax cuts is different from the above, though its impacts also depend on the size of the multiplier. Whereas an increase in G enters into the spending stream in its entirety, a cut in income taxes causes consumption to increase, but by less than the amount of the tax cut, because a tax cut is shared between an increase in consumption and an increase in leakages.

A simple calculation illustrates the difference.

Suppose that the *MPC* is $\frac{3}{4}$; this means that the multiplier = 4, since:

$$\frac{1}{1-MPC} = \frac{1}{1-\frac{3}{4}} = \frac{1}{\frac{1}{4}} = 4$$

Suppose too that government spending increases by \$1. It follows that aggregate demand increases by $\$1 \times 4 = \$4$. Now suppose that, instead, there is a tax cut of \$1. With the $MPC = \frac{3}{4}$, this leads to an increase in consumption of \$0.75 and an increase in leakages of \$0.25. The impact of the tax cut on aggregate demand is calculated in the usual way: we multiply the initial increase in consumption of \$0.75 by the multiplier of 4, and we have $\$0.75 \times 4 = \$3$. Therefore, aggregate demand increased by \$3 due to the cut in taxes, whereas it increases by \$4 from an increase in government spending.

Automatic stabilisers

You may be wondering how automatic stabilisers actually work in terms of how they affect aggregate demand and real GDP. Automatic stabilisers work by reducing the value of the multiplier, because they lower the size of the *MPC*. A smaller multiplier means smaller induced changes in consumption spending that arise from an initial change in a component of aggregate demand, and therefore a smaller change in real GDP.

Remember that the multiplier is:

$$\frac{1}{1-MPC} = \frac{1}{MPS+MPT+MPM}$$

where MPT is the marginal propensity to tax, defined as the fraction of additional income taxed. The more progressive the income taxes, the larger the MPT, the smaller the MPC, and therefore the smaller the multiplier. For example, given an increase in a component of AD, the induced change in real GDP due to the multiplier will be *smaller*, the more progressive the income taxes.

Unemployment benefits also stabilise the economy by reducing the value of the multiplier through a lower MPC. To see how this happens, suppose the $MPC = \frac{3}{4}$, indicating a multiplier of 4. If there occurs a $1 fall in autonomous investment spending, it leads initially to a $1 fall in income (creating a recessionary gap). If there are no unemployment benefits, the $1 fall in income will initially result in a $0.75 fall in consumption spending. Suppose then that unemployment benefits are introduced, partially replacing lost income and supporting consumption, so that the $1 fall in income leads initially to a $0.50 fall in consumption spending. This means that the MPC (defined as the fraction of additional income consumed) falls from $\frac{3}{4}$ to $\frac{1}{2}$. The multiplier has therefore fallen from 4 to 2. A smaller multiplier indicates that the induced changes in real GDP will be smaller.

Understanding aggregate demand and the multiplier in terms of the Keynesian cross model (recommended for HL)

John Maynard Keynes was a famous British economist who lived in the 20th century, and whose work laid the foundations for modern macroeconomics (see Chapter 1, Section 1.5). The model presented here is attributed to him, though it is a simplification of his highly technical work. This model is very helpful for understanding some important macroeconomic concepts, including the relationship between aggregate demand and aggregate output (real GDP); the Keynesian idea of less than full employment equilibrium; and the multiplier effect.

Consumption and investment spending

We have defined both aggregate demand and real GDP to consist of $C+I+G+(X-M)$, yet the two are not the same. How is this possible? To understand this, we must begin by making a distinction between *actual expenditure*, and *desired expenditure*. Aggregate output, or real GDP, is measured by adding up all *actual expenditures*, $C+I+G+(X-M)$, for the purchase of output (in the expenditure approach). Aggregate demand, on the other hand, is concerned with all *desired aggregate expenditures*, which adds up *desired* $C+I+G+(X-M)$ for the purchase of output.

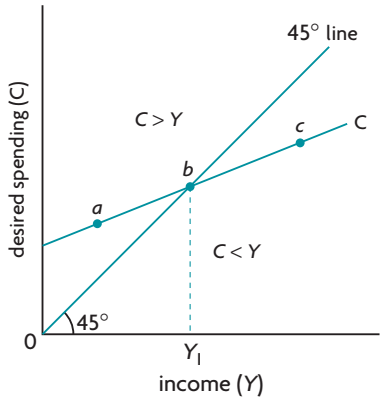
With this distinction in mind, we begin with a simple version of the model that includes only consumers and firms, and therefore only desired consumption (C) and desired investment (I) spending.

Desired consumption and desired investment spending

It is assumed that desired consumption, consisting of expenditures consumers desire to make in order to buy final goods and services, depends on consumers' real income. There is a positive, causal relationship between real income and consumption, shown in Figure SM6(a), where the vertical axis measures desired spending (the dependent variable), and the horizontal axis measures real income (Y, the independent variable). The higher the income, the greater is desired consumption spending. Note that the area between the two axes is cut by a line making a 45-degree angle with the horizontal axis. This line represents all points of equality between the variables measured on the two axes, and therefore equality between desired spending and income. Therefore at point b, desired consumption spending is exactly equal to income; at a, desired consumption is greater than income, while at c, desired consumption is less than income.

The C line, representing consumption spending, is called a **consumption function**, because C is a function of national income, Y. Since it is a straight line, it has a constant slope, given by $\frac{\Delta C}{\Delta Y}$ (the change in the dependent variable divided by the change in the independent variable, between any two points). The slope of the C function has a special meaning. It is the **marginal propensity to consume** (MPC), representing the change in desired consumption that results when there is a change in income. For example, suppose that income increases by $1000 million and consumption spending increase by $750 million. The slope, or MPC, is $\frac{750}{1000} = \frac{3}{4}$.

a Consumption spending



b Consumption plus investment spending

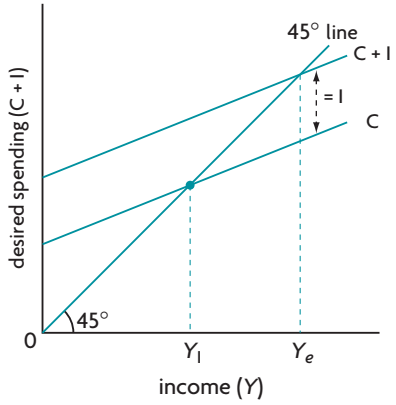


Figure SM6: The Keynesian cross model with consumption and investment spending

You may be wondering why the consumption function shown in Figure SM6(a) has the particular shape it has. The answer has to do with desired saving. Income is equal to desired consumption plus desired saving. Abbreviating saving as S, we can write $Y = C + S$. When income is low (lower than Y_1 in part a) and $C > Y$, saving is negative, because income is too low to provide consumers with enough money to buy their necessities (negative saving means that consumers are borrowing or else spending past savings from previous years). When incomes are higher (higher than Y_1) and $C < Y$, saving is positive.

What happens to desired saving; where does the money that consumers want to save go? To answer this question, we must recall the circular flow model with leakages and injections, where we saw that saving, a leakage from the spending flow, is matched by investment, an injection into the spending flow.

We will now add investment spending to our model, which is assumed to be independent of income, and so is a constant amount for all income levels. We simply add desired investment spending to desired consumption spending, in order to arrive at total desired spending, shown in Figure SM6(b). You can see that desired investment spending is a constant amount for all income levels, because the $C + I$ line is parallel to the C line.

Any kind of spending that is independent of income (meaning it is not 'caused' by income) is called *autonomous spending*. By contrast, any kind of spending that is dependent on income (is 'caused' by income) is called *induced spending*. Therefore, while consumption spending is induced, investment spending is autonomous.[2]

Equilibrium level of income and output

Now remember from the circular flow model that national income is equal to the value of aggregate output, or real GDP. This means we can re-label the horizontal axis of our diagram as in Figure SM7(a).

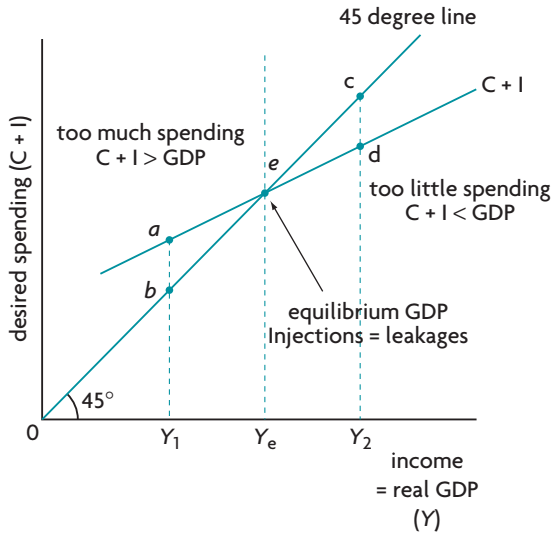
We are now ready to put together all our information and arrive at some important conclusions using Figure SM7(a), which is the same as Figure SM6(b) except that the C line (the consumption function) has been left out. We can see immediately that at point e, total desired spending of consumers and firms is exactly equal to national income or real GDP. This means that the amount that consumers and firms want (desire) to buy is exactly equal to the amount that is actually produced. *This is the equilibrium level of output in this model, shown as* Ye.

What happens when real GDP produced is less than Y_e? At Y_1, the amount consumers and firms want to buy (point a) is greater than the quantity of real GDP produced (point b). At Y_1, there is insufficient output to satisfy consumers' and firms' spending desires. On the other hand, if real GDP is greater than Y_e, such as Y_2, the amount that consumers and firms want to buy (point d) is less than real GDP produced (point c). Too many goods and services are being produced relative to what consumers and firms want to buy.

If the economy finds itself producing too much or too little real GDP relative to what buyers want, how is equilibrium restored? At Y_1, with too much spending relative to output produced, firms' inventories (unsold stocks from production of previous years) are sold, thus providing firms with the signal to increase production, causing real GDP to increase

[2] Actually, only a portion of consumption spending is induced. When income is zero, there is a positive level of consumption spending (given by the vertical-intercept of the consumption function); this is autonomous consumption. All consumption above this level is induced, as it is 'caused' by income.

a Equilibrium in the Keynesian cross model with *C* and *I*



b Equilibrium in the Keynesian cross model with *C*, *I*, *G*, and (*X* – *M*)

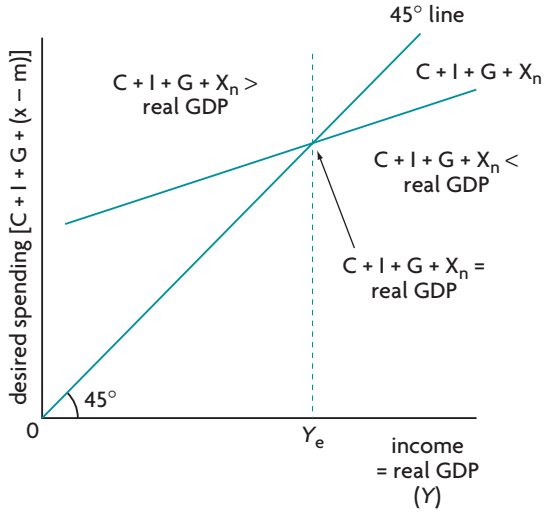


Figure SM7: Equilibrium in the Keynesian cross model

to Y_e. At Y_2, with too little spending relative to what is produced, firms' inventories increase, providing firms with the signal that they are producing too much, causing them to cut back on production, so real GDP falls to Y_e. Through this mechanism involving changes in inventories that provide signals to firms on whether they should produce less or more, equilibrium real GDP is restored.

We can also understand the meaning of Y_e by thinking in terms of leakages and injections. Recall that saving is a leakage and investment is an injection into the income flow. Since saving is that part of income that is not consumed, it follows that when total desired spending ($C + I$) is exactly equal to income, desired saving, or the leakage must be equal to desired investment, or the injection. Therefore, Y_e is the only level of real GDP where desired saving is exactly equal to desired investment, so that the leakage equals the injection.

Adding government and the foreign sector

It is assumed that government spending (G), and spending of foreigners for exports minus the spending of domestic residents for imports ($X - M$ or X_n for net exports) are independent of national income, and are therefore autonomous. It is thus a simple matter to add them into our model. We do so simply by adding $G + (X - M)$ to the $C + I$ function, as shown in Figure SM7(b).

It may be noted that adding X, which is an injection into spending, works to increase total desired spending, while adding M, a leakage, works to decrease it. Therefore, whether the addition of $(X - M)$ will increase or decrease total desired spending depends on the relative size of exports and imports. If $X > M$, then $(X - M) > 0$, and desired spending increases. However if $X < M$, then $(X - M) < 0$, and desired spending decreases. It should also be noted that the addition of government spending G is actually more complicated than shown in Figure SM8(b) because of the role of taxes, which are ignored here for simplicity. $C + I + G + X_n$, representing total desired spending, are referred to as **aggregate expenditure**. When aggregate expenditure is equal to real GDP, the economy is in equilibrium, as seen in Figure SM7(b). At this equilibrium, the sum of leakages is equal to the sum of injections, so that:

$$S + T + M = I + G + X$$

It is easy to understand the meaning of this equilibrium if we refer to the principle we studied in the circular flow model: in any given time period, the value of output produced by an economy is equal to the total income that is generated in producing that output, which is equal to the expenditures made to purchase that output. When the economy is at equilibrium in the Keynesian cross model, the value of output (real GDP) is exactly equal to the spending that purchases that output. This is made possible by the equality between injections and leakages. If the sums of injections and leakages are not equal to each other, the economy cannot be in equilibrium, because desired spending to buy output will be different from the value of output actually produced.

Relating aggregate expenditure to aggregate demand

You may have noticed that in the discussion above, there was no mention of the price level. The reason is that in the Keynesian cross model, total desired spending and real GDP are compared for a *single given price level*. The Keynesian cross model does

not show changes in the price level. The question that arises is what happens if the price level changes? Consider Figure SM8, showing an aggregate expenditure curve, AE_1, for a price level 1, with equilibrium real GDP Y_{e1}. Suppose there is an increase in the price level, from price level 1 to price level 2. This will appear in the figure as a downward shift of the entire aggregate expenditure function, to AE_2.

With AE_2, the equilibrium level of real GDP falls from Y_{e1} to Y_{e2}. If the price level increases further to price level 3, the AE function shifts further downward to AE_3, and equilibrium GDP falls to Y_{e3}.

a Aggregate expenditure with varying price levels

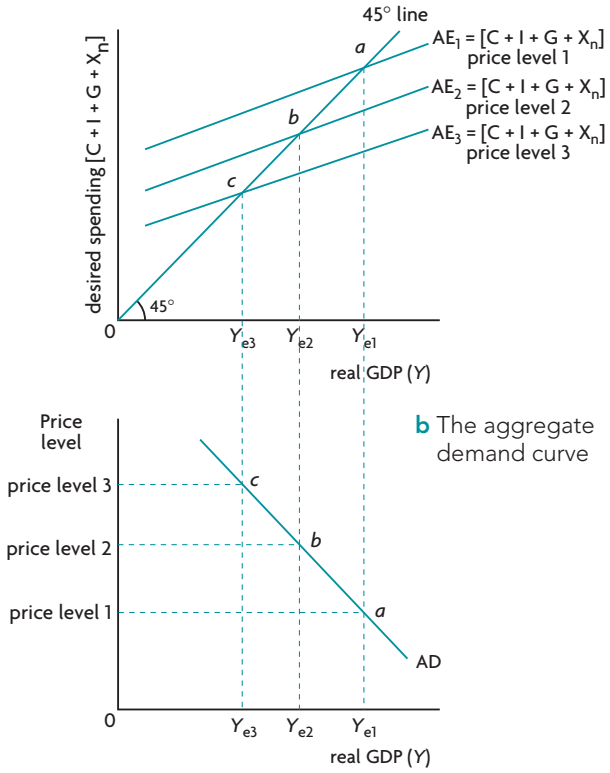


Figure SM8: Relating aggregate demand to aggregate expenditure

Why does an increase in the price level cause a fall in aggregate expenditures? There are three reasons for this:

- A higher price level means a decrease in the real value of wealth; consumers feel worse off and cut back on their desired level of spending.
- A higher price level means an increase in the demand for money, resulting in higher interest rates that cause the desired spending of consumers and firms to decrease due to the higher cost of borrowing.
- A higher price level means exports become more expensive to foreigners, while imports become less expensive to domestic buyers, causing X_n to fall.

Note that these reasons are exactly what accounts for the downward-sloping aggregate demand curve. In fact, by varying the price level in the Keynesian cross model, *we are deriving the aggregate demand curve*. This can be seen in Figure SM8(b), which derives an aggregate demand curve from the corresponding equilibrium points of the Keynesian cross model. In Figure SM8(a), at price level 1, equilibrium is at point a, which corresponds to point a of the aggregate demand curve in Figure SM8(b). As the price level falls, equilibrium moves to point b, and then to point c, resulting in the corresponding points of the aggregate demand curve.

We thus arrive at an important conclusion:

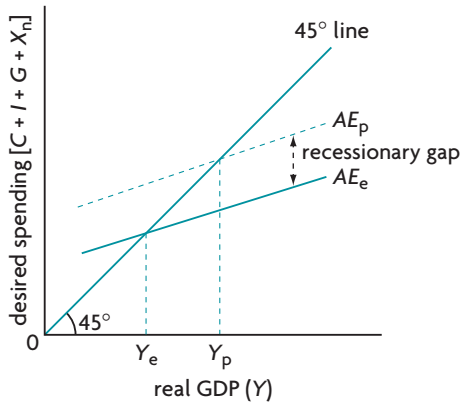
Each point on the aggregate demand curve corresponds to a particular price level where the amount of output buyers want to buy is just that output that generates the spending needed to buy the output (recall the circular flow model).

We can now return to our initial question: how is it that aggregate demand and real GDP, two very different concepts, are both defined in terms of $C + I + G + (X - M)$? The answer is that real GDP, appearing on the horizontal axis, shows various quantities of aggregate output that can be produced. If we were to measure this output for a particular year, we would add up the *actual spending* of the four groups of buyers ($C + I + G + (X - M)$) in order to obtain the value of aggregate output. Aggregate demand, on the other hand, shows the amount of aggregate output that the four groups of buyers *want to buy at each possible price level*, when that output generates just enough spending allowing them to buy that output.

The Keynesian cross model and inflationary/recessionary or deflationary gaps

Inflationary/recessionary or deflationary gaps were noted in our discussion of the business cycle in Chapter 9. They arise whenever actual output differs from potential output. We can now see how such gaps arise in the context of the Keynesian cross model, shown in Figure SM9. In both parts, Y_p represents potential output, which is full employment output. Y_e represents the equilibrium level of output, determined by the level of aggregate expenditures, AE_e. Note that *the equilibrium level of output need not be equal to potential output*.

a Recessionary (deflationary) gap



b Inflationary gap

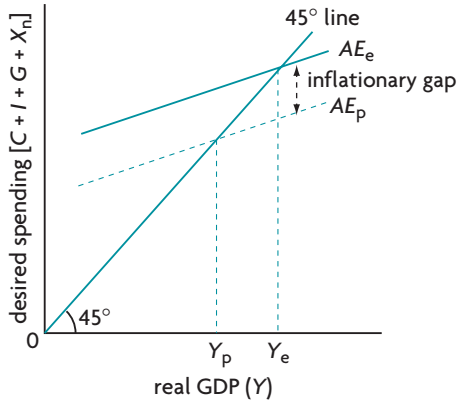


Figure SM9: Inflationary/recessionary or deflationary gaps in the Keynesian cross model

In part a, where Y_e is less than Y_p, there is an output gap called a **recessionary gap** (or **deflationary gap**). At Y_e, there is unemployment and recession. Actual equilibrium output is less than potential output, and unemployment is greater than the natural rate of unemployment. For potential output to be achieved, it would be necessary for aggregate expenditures to increase to the level of the dotted line, represented by AE_p.

In part (b), Y_e is greater than Y_p, and here there is an output gap called an **inflationary gap**. Actual equilibrium output is greater than potential output, and unemployment is less than the natural rate of unemployment. For potential output to be achieved, it would be necessary to have lower aggregate expenditures at the level of AE_p, shown by the dotted line.

However, there is nothing to guarantee that aggregate expenditures will be at the level of AE_p in both parts (a) and (b). This leads to the following important conclusion (which you are already familiar with from Chapter 9).

In the Keynesian cross model, equilibrium can occur at any level of output, and there is nothing to guarantee that the equilibrium level of output will be the same as potential output. Recessionary (deflationary) gaps or inflationary gaps may persist indefinitely.

The Keynesian multiplier

The Keynesian multiplier can be very conveniently illustrated by use of the Keynesian cross model.

According to the Keynesian multiplier effect, whenever there is an autonomous change in any of the components of aggregate expenditure (C, I, G or $X - M$), a *larger change* in real GDP results. Consider Figure SM10, showing an initial aggregate expenditure function AE_1, with equilibrium real GDP at Y_{e1}. Suppose there is an increase in investment spending of ΔI. This will cause aggregate expenditures to shift upward to $AE_2 (= AE_1 + \Delta I)$, with the new equilibrium real GDP at Y_{e2}. As you can see in the figure, the increase in real GDP, shown by $Y_2 - Y_1$ is larger than ΔI.

The multiplier effect has caused real GDP to increase by more than the increase in the component of aggregate expenditure. The increase in real GDP, or the difference between Y_2 and Y_1, consists of two parts: one is an increase due to the increase in autonomous investment expenditure equal to ΔI; and the rest is an increase due to induced consumption expenditure.

This idea corresponds to Figure 13.5 in Chapter 13, where the total increase in aggregate demand is broken down into two parts: that due to an increase in autonomous investment spending and that due to induced consumption spending.

Also, note that the increase in real GDP from Y_{e1} to Y_{e2} in Figure SM10 is the result of the full multiplier effect, which can only occur when the price level is constant (see Figure 13.6). Since the Keynesian cross model presupposes a constant price level, this means that an increase in autonomous spending and the subsequent increases in induced spending will be felt in their entirety as increased output. This can be seen in Figure 13.6 as the AD shift that takes place entirely within the horizontal part of the AS curve, which represents a constant price level.

The multiplier is a Keynesian concept showing the power of increased spending to induce larger increases in real GDP when the economy is in recession and is not experiencing upward pressures on the price level.

It is now also possible to use Figure SM10 to understand the relationship between the size of the multiplier and the MPC. As you know, the larger

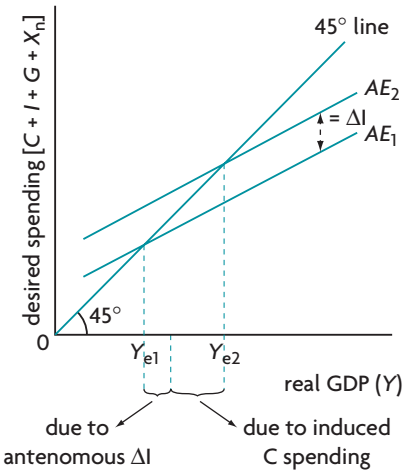


Figure SM10: Illustrating the Keynesian multiplier

the *MPC*, the larger the multiplier. Now that you know that the *MPC* is the slope of the aggregate expenditure function,[3] you can see why this is so. *The larger the slope of the aggregate expenditure function, the steeper the aggregate expenditure function, and the larger the multiplier and increase in real GDP given a change in autonomous expenditure. The smaller the slope, the flatter the aggregate expenditure function, and the smaller the multiplier and the increase in real GDP given a change in autonomous expenditure.* To convince yourself that this is so, draw an aggregate expenditure function, AE_1, that is parallel to the horizontal axis; this has a slope = $MPC = 0$. Now assume an increase in investment spending equal to ΔI, and draw a new aggregate expenditure function, $AE_2 = AE_1 + \Delta I$; this will also be parallel to the horizontal axis. You will see that the resulting change in real GDP will be equal to ΔI. The reason is that when the $MPC = 0$, the multiplier of $\frac{1}{1 - MPC}$ is equal to 1. Therefore, the change in real GDP is equal to the change in investment spending, and induced consumption spending is zero.

Chapter 14, Section 14.1

Calculating effects of free trade on producers, consumers and social surplus (recommended for HL)

The exporting country

Producers

In Figure 14.2(a) in the coursebook we can see that producer revenue before trade was the domestic quantity produced times the domestic price = 60 million × \$5 = \$300. Producer revenue with exports is quantity produced times the world price they receive per unit = 100 million × \$7 = \$700 million. *Therefore total producer revenue has increased by \$ 700 – \$300 = \$400 million.*

The larger quantity and higher price explain the increase in producer surplus which we will now calculate. Remember that producer surplus is the area above the supply curve up to the price received by the producer (see Chapter 2). Before exports, producer surplus was $(5 - 2) \times \frac{60}{2} = \$90$ million. With exports producer surplus is $(7 - 2) \times \frac{100}{2} = \$250$ million.

Therefore producer surplus increased by \$250 – \$90 = \$160 million.

Consumers

Figure 14.2(a) shows that with trade domestic consumption of bindles fell from 60 million to 20 million bindles, while the price consumers must pay increased from \$5 to \$7 per bindle. Consumer expenditure went from \$300 million to \$140 million. The lower quantity and higher price explain the loss of consumer surplus (the area under the demand curve up to the price paid by consumers; see Chapter 2). Consumer surplus before exports was $(8 - 5) \times \frac{60}{2} = \$90$ million. With exports, consumer surplus fell to $(8 - 7) \times \frac{20}{2} = \$10$ million. *Therefore consumer surplus decreased by \$90 – \$10 = \$80 million.*

Social surplus

An examination of Figure 14.2(a) reveals that *social surplus has increased by the amount of the area of triangle X*. This is equal to $(7 - 5) \times \frac{(100 - 2)}{2} = \$80$ million. This is also clear from our calculations above showing that the increase of producer surplus (\$160 million) is greater than the decrease of consumer surplus (\$80 million). Producers took away part of consumer surplus due to the higher price and in addition gained additional surplus X. *Therefore society overall is better off with exports than without exports.*

The importing country

Producers

Figure 14.2(b) shows that producer revenue has fallen as quantity produced fell from 60 million without imports to 20 million with imports, while the price fell from \$5 to the world price of \$3. Producer revenue

[3] Actually, the *MPC* is the slope of the consumption function, as we saw earlier. However, since the aggregate expenditure function is a parallel upward shift of the consumption function, the slope does not change.

before trade was 60 million × \$5 = \$300 million while with imports it is 20 million × \$3 = \$60 million. *Therefore producer revenue fell by \$300 million – \$60 million = \$240 million.*

Producers are worse off due to the fall in quantity produced and the fall in price, which explains the loss of producer surplus. Before imports producer surplus was $(5-2)\times\frac{60}{2}$ = \$90 million. With imports producer surplus fell to $(3-2)\times\frac{20}{2}$ = \$10 million.

Therefore producer surplus fell by \$90 = \$10 = \$80 million.

Consumers

By contrast consumers are better off when the good is imported because they pay the lower world price of \$3 rather than \$5 and they buy the larger quantity of 100 million rather than 60 million bindles. Therefore consumer surplus increases. Consumer surplus before imports was $(8-5)\times\frac{60}{2}$ = \$90 million. With imports consumer surplus is $(8-3)\times\frac{100}{2}$ = \$250 million.

Therefore consumer surplus increased by \$250 –\$90 = \$160 million.

Social surplus

In Figure 14.2(b) we see that *social surplus increased by the area of triangle X*. This is equal to $(5-3)\times\frac{(100-2)}{2}$ = \$80 million. This also follows from our calculations since the gain in consumer surplus of \$160 million is greater than the loss of producer surplus of \$80 million. In this case consumers took away a portion of producer surplus due to the lower price and in addition gained triangle X. *Therefore society overall is better off with imports than without imports.*

Notice the very interesting pattern:

- With exports, producers gain at the expense of consumers, and since the producer gain is greater than the consumer loss, society is better off with the net gain in social surplus.
- With imports, consumers gain at the expense of producers, and since the consumer gain is greater than the producer loss, society is better with the net gain in social surplus.
- Whether a country is an exporter or an importer, it will always have welfare gains with international trade relative to its situation with no trade (autarky

Chapter 17, Section 17.4

Understanding the Marshall-Lerner condition in more detail

The Marshall-Lerner condition leads to the surprising conclusion that devaluation or depreciation can improve the balance of trade (hence the current account) even if $PED_m<1$ and $PED_x<1$, as long as the sum of the two elasticities is greater than one.

The explanation for this result lies in the fact that devaluation or depreciation leads to a change in the price of exports only when this price is expressed in terms of foreign (appreciating) currencies; by contrast, the price of exports remains the same in terms of the domestic currency. (To see why this is so, consider an export good X produced in Riverland that sells for Rvl 2 per unit. Riverland exports good X to the United States at the exchange rate \$1=Rvl 2, so that US residents can buy 1 unit of X for \$1. Suppose then that the Rvl depreciates relative to the \$ and the new exchange rate is \$1=Rvl 4. US residents can now buy 2 units of X for \$1, meaning that the price of X fell to \$0.50 per unit. In Riverland, however, the price of X is still Rvl 2 per unit.)

Given a depreciation, the quantity of exports will always increase in view of the fall in price in terms of foreign currencies. But since the price of the good remains the same in terms of the domestic currency, this means there will result an increase in export revenues (in terms of the domestic currency), regardless of the size of the *PED* for exports. Now if $PED_m>1$, there occurs a fall in import expenditures, therefore together with the increase in export revenues there follows an improvement in the trade balance. But if $PED_m<1$, there results an increase in import expenditures. In order to have an improvement in the trade balance, the increase in export revenues must be larger than the increase in import expenditures. This occurs when $PED_m + PED_x>1$, or when the Marshall-Lerner condition holds

Chapter 17, Section 17.4

Fiscal and monetary policy and conflicting objectives in an open economy

Fiscal policy

An expansionary fiscal policy financed by government borrowing may lead to higher interest rates, which may crowd out private investment, weakening the expansionary effect of increased government spending (see Chapter 13). In an open economy,

a higher interest rate has the additional effect of appreciating the currency, which in turn lowers exports and increases imports (net exports, *X–M*, fall), which also *weakens the expansionary effects of the increase in government spending*.

Monetary policy

Expansionary monetary policy and the trade balance

Expansionary monetary policy intended to increase aggregate demand (in a recession) lowers interest rates, but also depreciates the currency, increasing exports and decreasing imports (a rise in net exports, X–M). An increase in net exports strengthens the expansionary effects of lower interest rates, but also affects the trade balance. If the economy has a trade deficit, an increase in X–M makes it shrink, but if there is a trade surplus, an increase in X–M makes it grow larger. Therefore *expansionary monetary policy improves a trade deficit and worsens a trade surplus*.

Contractionary monetary policy and the trade balance

In an inflation, contractionary monetary policy involves higher interest rates, intended to lower aggregate demand, but also results in currency appreciation, and therefore falling exports and increasing imports (net exports, *X–M* fall). While a fall in net exports strengthens the contractionary effects of tight money policy, it also affects the trade balance. If there is a trade deficit, the fall in net exports makes this grow bigger; if there is trade surplus the fall in net exports makes it shrink. Therefore *contractionary monetary policy worsens a trade deficit but improves a trade surplus*.

Preventing currency speculation and recession

If an economy is concerned that speculators may 'attack' its currency (sell it because of the expectation that it will fall), it may raise interest rates to make the currency more attractive; however, this may create a recession, or, if the economy is already in recession, make the recession worse.

Cost-push inflation (due to higher import prices) and recession

If an economy is experiencing cost-push inflation due to increased import prices, higher interest rates appreciate the currency, and lower import prices, thus helping correct the problem of cost-push inflation. But higher interest rates may create a recession or make an already existing recession worse. Remember, cost-push inflation has the effect of shifting the *SRAS* curve to the left, so the economy already faces falling real GDP; this will be worsened by the higher interest rates.

These potential problems do not contradict the point made in the coursebook (Section 17.2) that policy-making under freely floating exchange rates is flexible. Under fixed exchange rates, fiscal and monetary policies must respond to balance of payments needs. Under floating exchange rates, fiscal and monetary policy can be undertaken in response to domestic needs, however policies sometimes have unintended and undesirable consequences in the foreign sector

Chapter 19, Section 19.2

Indebtedness – historical background

Before the 1970s, borrowing by developing country governments took place on a small scale. Countries borrowed from international organisations like the World Bank and International Monetary Fund (IMF) (see Chapter 20) as well as foreign governments, mainly in order to supplement insufficient savings and increase domestic resources to pursue growth and development objectives.

The beginnings of the debt problem date back to the oil shock of 1973–1974, when the Organization of the Petroleum Exporting Countries (OPEC) suddenly increased the price of oil. Almost overnight, oil-importing developing countries were faced with larger import expenditures due to higher oil prices. In addition, they faced lower export revenues because the oil price increases created recessions (stagflation) in developed countries, resulting in a lower demand for developing country exports. These two events resulted in larger trade and current account deficits in developing countries, creating a need for increased foreign borrowing that would provide the foreign exchange needed to cover their deficits.

A related event made it easier for developing countries to borrow more. After the oil price increases the OPEC nations found themselves with much larger oil revenues, much of which they deposited in commercial banks in developed countries, mainly in the United States, Europe and Japan. The commercial banks, seeing very large increases in their supply of loanable funds, began aggressively competing with each other to lend to developing countries. The developing countries' need for new loans coincided with the international banking system's need to make new loans. This lending pattern came to be known as 'petrodollar recycling', involving commercial banks lending to oil-importing countries the same funds that came from oil exporters, to allow the developing countries to continue to import oil.

As commercial banks competed with each other to lend as much as possible of their petrodollars, they did not take care to lend prudently. There was a belief that if there were losses on their loans (if developing countries could not make loan re-payments), the losses would be covered by the public sector

(developed country governments, the World Bank and International Monetary Fund).

In the meantime, developed country governments supported the rapid growth of commercial bank lending to developing countries, because they saw petrodollar recycling as an opportunity to cut back on foreign aid and development assistance (to be discussed in Chapter 20). Developing countries, for their part, did not always spend the loan funds wisely. While a portion of the funds was used for investments in infrastructure and debt servicing, in some countries loan funds supported public spending that should have been financed by government tax revenues. This allowed governments to enjoy broad political support by maintaining low tax rates as well as poor and low tax collection. Loan funds were sometimes used to finance the operation of inefficient public enterprises; even worse, they often disappeared into the pockets of corrupt bureaucrats and elites.

A second oil price shock occurred in 1979. Developing countries were faced with two options: they could pursue restrictive monetary and fiscal policies to create a recession that would cut back on imports, thus saving on the need for foreign exchange, or they could borrow more. As more borrowing was preferable to recession, levels of debt in many countries reached massive proportions.

By the early 1980s, the level of debt had grown massively in some countries, especially in Latin America and sub-Saharan Africa, and some were on the verge of bankruptcy. Commercial banks and the international community suddenly woke up to the possibility of a banking collapse and a major global financial crisis, should countries default on their loans.

Beginning in 1982, the international community, led by the IMF, the World Bank and the US government, stepped in with a series of measures to prevent developing country defaults. These policies of the World Bank and IMF are discussed in Chapter 20 of the coursebook.