## Introduction

Macroeconomics concerns the relationship between spending, output and income at the aggregate (whole economy) level. This chapter examines the role of spending in determining the level of production and income in the economy. Firstly, we outline the components of aggregate expenditure and examine the factors that affect each of them. We then develop the aggregate expenditure model (also known as the Keynesian aggregate expenditure model) that will help us to explain the concept of 'macroeconomic equilibrium', what happens when levels of spending change, and how these relate to the expansions and contractions associated with the business cycle.

## Aggregate expenditure AE=C+I+G+(X-M)

Aggregate expenditure is the sum of all expenditure on final goods and services undertaken in the economy during a specific time period. It consists of consumption (household expenditure on final goods and services); investment (spending on capital equipment); government spending; and net exports (exports minus imports). We often use an equation:

$$AE = C + I + G + (X - M)$$

### The components of aggregate expenditure

Australia's Gross Domestic Product in 2021-22 amounted to nearly $2.1 trillion dollars – $2,091 billion. The largest component of aggregate expenditure was consumption expenditure – household expenditure on goods and services. Consumption accounted for 53 per cent of the total ($1,103 billion). Consumption consists of:

- expenditure on non–durable goods;
- expenditure on durable goods; and
- expenditure on services. text

Goods are tangible (they can be seen and touched). Non-durable goods are consumed shortly after purchase (technically, up to three years). This includes food, drinks, fuel, cosmetics, cleaning products, paper products, textiles, clothing and footwear. Much of this spending could be regarded as essential, as it satisfies the regular needs of most households. This means non–durable consumption spending is fairly stable over the course of time, typically accounting for about 35 per cent of total consumption expenditure.

As their name implies, durable goods last for a longer period of time – by definition, three or more years. Durable goods include white goods (large items such as washing machines, fridges, ovens); brown goods (light household items such as computers, audio equipment and televisions); furniture; sporting equipment; and motor vehicles. Spending on durable goods is often 'discretionary' (meaning it can be postponed or brought forward, depending on the individual household's





circumstances). Expenditure on durable goods is thought to account for about 15 per cent of aggregate consumption.

Services are intangible and provide transitory satisfaction of wants. Examples include education, transport, health, and household utilities. In modern economies, spending on services makes up the largest of the three slices of the consumption cake, accounting for approximately 50 per cent of all household expenditure. Some services are essential, such as education, health services and transport, while others are discretionary, such as spending on entertainment and leisure.

*We could use the monetary (or current price) values of transactions to measure total expenditure at a point in time. This creates problems when comparing expenditure over time if the price level has changed (inflation). Because the ABS wants to measure the quantity of commodities produced or sold, and not changes in the prices of those items, it could apply 'constant price' or 'chain volume' measures to value production. It has used chain measures for over twenty years - unless otherwise stated, chain volume measures are used in this book.*

In Australia, consumption spending averaged 56 per cent of aggregate expenditure (ranging between 49 to 60 per cent of the total) over the period 1980 - 2022 (see figure 9.2).

The second component of aggregate expenditure is private sector investment. Economists define investment as spending on new capital goods, and additions to inventories. A capital good is any item of machinery that is used to assist labour in the production process. Investment spending in the national accounts (gross private investment) is divided into three categories:

- business investment – privately funded business spending on capital goods used in production - equipment, machinery and buildings;
- housing investment – private expenditure on new housing; and
- inventories – unsold goods, sometimes described as 'stock'.

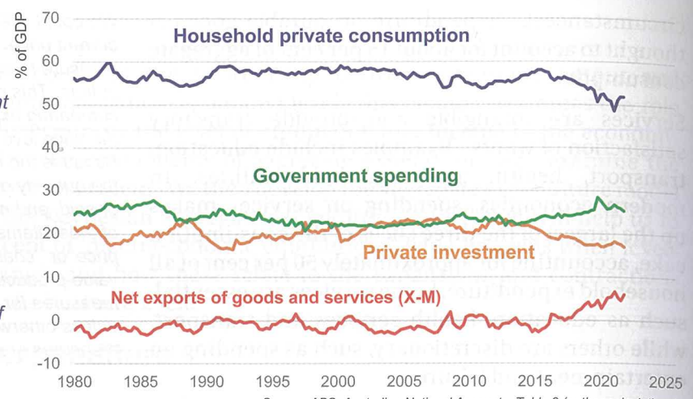
In 2021-22, private investment accounted for 18 per cent of aggregate expenditure in the Australian economy. Investment spending is the most volatile component

**Figure 9.1 The components of aggregate expenditure**

| Component | | Description |
|---|---|---|
| Consumption | C | expenditure on non-durable goods - food, clothing, petrol;<br>expenditure on consumer durables - white goods, furniture, motor vehicles; and<br>expenditure on services - doctors, plumbers, mechanics |
| Planned investment | Ip | planned business expenditure on new capital equipment - machines, factories, buildings, tools; and<br>expenditure on new housing |
| Government | G | G1 – current (consumption) expenditure which are part of the day-to-day functions of government; and<br>G2 – capital (investment) expenditure to provide for future needs such as schools, roads, power, communications |
| Net Exports | X - M | exports minus imports (of goods and services) |

*On average, consumption spending accounts for 56 per cent of GDP; investment 20 per cent; government spending 24 per cent and net exports -1 per cent (figures rounded).*

*Investment shows greatest variability - minimum 16 per cent of AE, maximum 23 per cent.*




Source: ABS, Australian National Accounts, Table 3 (author calculations)

**Figure 9.2 Aggregate expenditure proportions 1980-2022**

of aggregate expenditure. Over the last forty years, private investment has accounted for between 16 per cent and 23 per cent of Australia's GDP. As discussed in the last chapter, fluctuations in private investment spending are thought to be a key factor in explaining changes in economic activity over the course of the business cycle.

Government expenditure is the third component of aggregate expenditure. In 2021-22, total government spending in Australia amounted to $580 billion, which represented 27 per cent of aggregate spending. Government spending is made up of current spending (G1) and capital spending (G2). Current spending finances the day-to-day business of government such as wages and salaries, and purchases of goods and services. Capital expenditure is spending on public infrastructure such as power and water supply, public buildings, schools, roads, railways and communications networks.

Net exports (exports minus imports) is the final element of aggregate expenditure. Overseas purchases of goods and services produced in Australia is an export in Australia's national accounts, and adds to aggregate expenditure. Imports occur when Australian households, firms, and governments purchase goods and services from overseas. Imports are a withdrawal from the circular flow of income, and thus reduce the aggregate amount of expenditure on Australian goods and services.

Figure 9.2 reveals some interesting recent trends. Firstly, consumption as a proportion of aggregate spending has fallen since about 2016. This was exacerbated by the pandemic, when shutdowns affected normal buying patterns and household savings rose. Secondly, net exports have often been negative in Australia (that is, imports exceeded exports). In the last few years, however, net exports of goods and services (the trade balance) has been positive, and up to





6 per cent of GDP! Outbound tourism (normally Australia's largest import) was severely impacted by travel restrictions associated with COVID-19. The fall in consumption and investment spending also reduced the demand for imports. Thirdly, government spending rose, reflecting the economic support provided to households and businesses through policies such as JobKeeper.

This completes the brief description of the components of aggregate expenditure (AE). We now investigate the factors that affect the components of aggregate expenditure – this will give further insight into the nature and causes of the business cycle described in the last chapter.

## The determinants of aggregate expenditure

Although economists are interested in how much spending occurs in each sector of the economy, they are actually more concerned with why that spending changes over the course of the business cycle! Hence we need to explore the factors that influence each of the components of aggregate expenditure.

### *Factors affecting consumption spending*

Aggregate consumption includes household spending on day-to-day items such as food and clothing (non-durable items), durables such major appliances, consumer electronics and furniture, and services such as health and education. Expenditure on household necessities is stable over the course of the business cycle. Discretionary expenditure varies according to changes in households' income; wealth; willingness to borrow; and expectations about future job security.

The most important factor affecting aggregate consumption is the level of disposable income (Yd) – the income households have available after tax. As we would expect, there is a positive relationship between the amount households spend on consumption and their disposable income. But the proportion declines as income rises. A household with a disposable income of $50,000 may spend $40,000 (80 per cent of their income). A family unit with a disposable income of $100,000 may spend a greater amount in absolute terms (say $70,000), but this represents a smaller proportion of their income. This relationship – the consumption function – is the cornerstone of the Keynesian aggregate expenditure model developed later in this chapter.

Households often borrow to finance discretionary consumption, so the cost of credit (the interest rate) is relevant in their decisions. Interest rates represent the price of money – the cost of borrowing. We would expect low interest rates to have a positive effect on household spending because:

- if credit has been used to fund consumption, the periodic repayments are a smaller slice of disposable income, and
- the opportunity cost of consumption falls. In other words, saving is less attractive when interest rates are low because funds in interest-bearing accounts earn a lower rate of return.

On the other hand, rising rates cause households to postpone discretionary consumption, because loan repayments take up a larger proportion of disposable income, and because the opportunity cost of consumption spending increases.

Households' perceived stock of wealth is another factor that influences aggregate consumption. Households that hold real assets such as property or shares tend to feel wealthier or more confident when share prices or property prices are rising. The 'wealth effect' can also act as a drag on consumption, as illustrated in early 2020, when the value of public companies fell on world markets. In Australia, the ASX index for the top 200 companies fell from 7144 on 18 February to 4735 on 23 March, although half of those losses were restored by the end of the financial year. Although this fall in value may have only been 'on-paper', the decline in the stock of wealth caused many households to change their spending and saving patterns.

*A reflection of the impact of confidence on economic behaviour is the net savings rate (the proportion of household disposable income directed to 'saving'). The Australian savings rate was negative at times during the mid 2000s, rose markedly to 10% after the GFC, then fell to about 3%, before climbing above 5% in 2022.*

Consumer sentiment and expectations play an important role in spending decisions. News concerning economic growth, changes in interest rates, changes in exchange rates, and movements in the share and property markets effect household confidence, and thus their willingness to purchase goods and services. The impact of changing expectations on spending on essentials such as food, clothing and transport is probably small. Consumer sentiment has a greater impact on household intentions to purchase discretionary items such as holidays, computers, televisions and motor vehicles.

The list of factors discussed above is not exhaustive. Other influences on aggregate consumption could include changes in exchange rates; the distribution of income and wealth; demographic factors (such as the changing age structure of the population); exogenous events (external shocks such as COVID-19); and changes in community attitudes – mitigating the effects of climate change may bring considerable changes in household consumption patterns in the next few years.

Government economic policy (see chapters 12 and 13) also influences household consumption. The Reserve Bank of Australia administers monetary policy using the 'cash rate' – the official interest rate. If the cash rate rises, higher interest rates generally flow through to other financial markets. Banks, for example, are likely to lift interest rates charged on personal loans and housing mortgages, meaning households have less spending power. The Commonwealth Government (Treasury) is responsible for fiscal policy – using the government's spending and taxing powers to influence household and business decisions.

### Factors influencing investment expenditure

Investment is expenditure on new capital goods that will be used to produce final goods and services in the future. Aggregate private investment is the most volatile element of aggregate expenditure, ranging between 16 and 23 per cent of the total over the last fifty years.





It is important to remember that when businesses invest, they are expecting to get a positive return in the future. As the future is unknown, it involves risk. Investment rises and falls according to the perceived risk which the future entails. Many factors (both economic and non-economic) influence risk – political decisions; international events; and changes in consumer sentiment being examples.

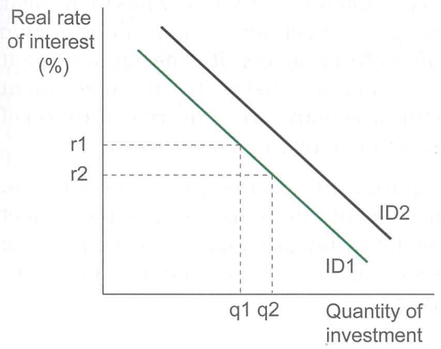
*Risk is the chance that the actual outcome from an investment will be different from the expected outcome. Returns could be better or worse than expected - in economics and finance, the term risk refers to the probability of difference. This could be positive or negative!*

The rate of interest plays a key role in business investment decisions. Other things being equal, interest rates and the level of investment expenditure are negatively related. This concept is illustrated by the investment demand curve, illustrated in figure 9.3. Lower rates of interest (r) tend to induce higher investment expenditure. If interest rates fall from r1 to r2, for example, we would expect an expansion in investment demand from point q1 to point q2.

There are two explanations for the inverse relationship between interest rates and investment. Firstly, interest rates represent the price of borrowed money, so when rates rise, so do the periodic repayments on borrowed funds. Secondly, interest rates represent the opportunity cost of money. Firms have the choice of using retained profit for new investment or some alternative purpose. The opportunity cost of investment increases when interest rates are high. For example, if business interest rates were 8 per cent p.a., the prospective rate of return on capital equipment must exceed 8 per cent (and by a considerable margin) before a rational firm would consider the investment to be a prudent decision.

It is important to understand the difference between nominal and real rates of interest. Nominal interest rates are the current price of borrowed money (i.e. the advertised or published rate). The real rate of interest takes the rate of inflation into account. If nominal rates of interest are 8 per cent, and expected inflation is 4 per cent, then the real rate of interest is 4 per cent (8 minus 4). Real rates of

**Figure 9.3 The investment demand curve**




*The investment demand curve describes a negative relationship between the (real) interest rate and planned investment. Lower real rates of interest tend to induce higher investment expenditure. If interest rates fall from r1 to r2, we would expect a movement along the investment demand curve - the level of investment will expand from q1 to q2 on ID 1.*

*The curve ID 2 shows a shift of the whole investment demand schedule. This would result from a favourable change in one of the other (non-price) factors affecting investment (e.g. improved business confidence).*

interest are more important to decision-makers than nominal rates, because they reflect the 'true cost' of borrowed money.

In figure 9.3, the investment demand curve ID 2 represents a positive shift of the whole investment demand curve brought about by a change in one of the non-interest rate factors affecting investment. For example, positive expectations about the business climate would cause a shift of the investment demand curve from ID1 to ID2. So too would increased business profitability, as many firms use profits to purchase new equipment.

While the relationship between interest rates and investment illustrated in figure 9.3 is clear, the responsiveness of investment spennding to changes in interest rates is less certain. Economists refer to this as the 'elasticity of investment with respect to interest rates'. The interest rate elasticity of investment may be influenced by the current stage of the business cycle and expectations about the future. In a cyclical upswing, for example, producers are likely to be upbeat about future prospects and continue to invest despite rising interest rates. On the other hand, during a contraction or trough phase, expectations of lower levels of economic activity and profits are likely to hold back investment decisions, even though interest rates may be relatively low. Over the period September 2017 to April 2022, interest rates were at historic low levels in Australia, yet business investment spending was below average levels.

Investment spending is linked to profitability in the business sector. Many firms retain a portion of their profits to buy new equipment. When economic conditions are challenging and profits low, firms tend to run down (depreciate) capital equipment over a longer period of time. On the other hand, a booming economy tends to lift profits, providing a pool of funds to spend on new capital items. Note that technological progress is embodied in new capital items. This means that firms invest to take advantage of the lower average costs of production and increased efficiency that the capital equipment can deliver. Investment in more efficient equipment is an important business strategy to lower unit costs, even when the level of economic activity is low.

Business expectations are an important determinant of investment – what business thinks about the current level of economic activity and trends in the near future. Business sentiment is is influenced by perceptions of current economic events such as levels of sales and inquiries from buyers. If expectations about future sales and profit levels are positive, then it is likely that the investment demand curve will shift to the right. On the other hand, a downturn in the level of business confidence could result in a reduction in planned investment.

Government policies can also have a significant impact on private investment. Fiscal and monetary policies affect investment decisions because they affect costs and expected sales revenue. Taxing the earnings of an industry can change the risk / reward relationship in that sector. On the other hand, tax incentives may attract investment funds to an industry.





The government's record in achieving key macroeconomic objectives (growth, price stability and full employment) also helps to foster a positive business environment. A stable macroeconomic environment is important for long-life private sector investment projects, such as construction, mining and transport. Stability really means the level of certainty provided by the institutional, political and legal system. Responsible and stable government is an important element in providing certainty for decision-makers. The government's regulatory framework can also affect market structures and the level of competition in the economy. In recent years, microeconomic reforms have improved productivity and competitiveness (see chapter 14). These reforms have had an impact on the cost of business regulations, the availability of funds for investment, and the openness of markets.

### Factors influencing government expenditure

The majority of government spending is on current items – the goods and services consumed by government institutions and the wages and salaries paid to employees. In the main, this size of that spending is governed by the need to fund essential services such as heath, defence, education and social security, which are themselves governed by the size of the population. The government also undertakes investment in essential infrastructure – public utilities such as power and water supply, roads, railways and communications networks. These decisions are also governed by the need to provide appropriate levels of service across all communities.

Sometimes, their timing might be influenced by the state of the economy. It would be inappropriate, for example, to undertake a major new infrastructure project when the economy was operating at full capacity, as this would worsen supply bottlenecks and build inflationary pressure.

In general, economic factors are not considered central to government consumption and investment decisions. They do, of course, affect government policy decisions, as will be discussed in chapters 12 and 13.

### Factors affecting net exports

Exports and imports of goods and services are reasonably volatile components of aggregate expenditure, particularly in Australia, because of the nature of its traded goods and services. Overseas demand for Australian commodity exports fluctuates according to regional and world economic conditions. Domestic supply can also contribute to volatility, as agricultural and pastoral commodities are influenced by the vagaries of seasons and events such as drought.

Domestic levels of economic activity influence Australians' propensity (willingness) to import. Australian imports are thought to be relatively elastic with respect to GDP – that is, if GDP rises by 2 per cent, then it is likely that imports will rise by more than 2 per cent. This reflects the small size of Australia's manufacturing sector. In periods of strong economic activity, consumers import

goods that cannot be sourced from local manufacturers, and businesses buy capital equipment that may not be produced in Australia.

The exchange rate is an important determinant of expenditure on exports and imports. When the Australian dollar appreciates, domestic residents can buy more units of other currencies, so imports are cheaper and more competitive against domestically produced items. An appreciation also means that overseas residents can buy fewer units of AUD, so Australian exports become less competitive in overseas markets. Other things being equal, an appreciation of the currency has a contractionary effect on aggregate expenditure because net exports fall. On the other hand, if the Australian dollar depreciates against other currencies, the price of Australian exports falls for overseas buyers, but prices paid for imports increases. The impact of any change in the exchange rate will depend on relative price elasticities – how buyers react to the price changes brought about by changes in the exchange rate.

Movements in the terms of trade play a significant role in determining spending on exports and imports. Australia's exports are dominated by mineral and agricultural commodities such as iron ore, coal, wheat and barley. In the early 2010s, the rapid growth of the Chinese economy meant that demand for mineral commodities rose and their prices reached record levels, boosting Australia's export price index. Other things being equal, this means that Australia's export income rises. Australian mining companies received a double dividend from

**Figure 9.4 The determinants of AE**

| | |
|---|---|
| Factors influencing aggregate consumption expenditure<br>C | • disposable income (Yd)<br>• interest rates (r)<br>• expectations<br>• availability of credit<br>• stock of wealth (property, shares) |
| Factors influencing aggregate planned investment expenditure<br>Ip | • business expectations<br>• interest rates (r)<br>• level of past profits<br>• government policies (e.g. taxation) |
| Factors influencing government expenditure<br>G | • discretionary changes in accordance with government policy objectives e.g. social policies, health, education<br>• automatic changes due to the business cycle<br>• can be used to stabilise macroeconomic fluctuations |
| Factors influencing net exports<br>X - M | • level of domestic and overseas economic activity<br>• exchange rates<br>• terms of trade<br>• presence of tariffs; quotas |





rising world demand – higher prices and higher sales. At the same time, Australia's import price index fell. Again, the reason seems related to Asia, where labour is cheaper than in Australia. Recently, the terms of trade has risen strongly, due in part to the impact of the war in Ukraine on the prices of agricultural commodities that comprise a large part of Australia's exports.

Alternatively, a falling terms of trade (as happened between 2012–2016) sees the prices received for exports fall relative to the prices paid for imports, in which case net export receipts are likely to fall (net of volume effects).

Figure 9.4 summarises the factors which affect the components of aggregate expenditure. There are clearly many factors in play that could potentially change aggregate expenditure at any point in time.

## Changes in aggregate expenditure

Consider the following situations:

- You are the manager of a plumbing supplies firm. New home construction is at its highest level for four years. How would the building boom effect (a) your level of inventory (b) the size of the orders you lodge with suppliers, and (c) the size of your business loans?
- You own a restaurant. How would an economic downturn affect the number of customers who make bookings; the number of staff you employ; and the quantity of food and beverage you order from suppliers each week?

It is logical that the plumbing supplies firm would turn over its stock more quickly in a building boom; that it would place larger orders with suppliers; and that it may have to ask the bank manager for more operating funds. In a downturn, the restaurant would probably sell fewer meals and bottles of wine as people reduce their entertainment budget. As a result, they would employ fewer chefs and wait staff, and place smaller orders with suppliers of food, beverage and equipment.

The impact of any change in aggregate expenditure is felt widely across the whole economy. Macroeconomics is the study of the whole the economy – the study of economic aggregates. All economic activity revolves around the production of output (O), the earning of income (Y), and the spending of that income (E - expenditure). Essentially, when aggregate expenditure (AE) rises, output, income and GDP must also rise. On the other hand, a fall in aggregate expenditure (AE) will result in lower output, lower income and lower employment.

## The Keynesian aggregate expenditure model

To analyse the impact of changes in aggregate expenditure on economic activity we introduce the Keynesian expenditure model, based on the work of British economist John Maynard Keynes. Keynes developed his theory of aggregate expenditure in the 1930s, in the midst of the Great Depression, when economic

growth averaged –5 percent for each of the years 1929 – 1931, and unemployment in some countries exceeded 30 per cent of the work force! Prior to the Depression, economists generally thought that the economy would always operate near full employment if prices (including wages) were free to adjust to market conditions. As a result, they believed there was no need for government intervention and that the government should balance its budget. Government spending should match revenue collected, no matter what the state of the economy!

Keynes, however, argued that aggregate demand determined the overall level of economic activity, and that inadequate aggregate demand could lead to prolonged periods of high unemployment. He proposed the active use of fiscal and monetary policies to mitigate the adverse effects of downturns in aggregate demand. His ideas were developed and popularised through the 1940s and 1950s, and came to be known as the 'Keynesian Revolution'. Whilst economic cycles continue, their size and impact is smaller than was the case prior to the acceptance of those ideas.

## The consumption function

The Keynesian expenditure model is based on the relationship between the level of disposable income received by households, and the level of consumption and saving. This is known as the consumption function. Initially, we assume that there is no government sector and no overseas sector – so there are only two possible ways that people can use their disposable income: spend it or save it. In other words,

$$Y = C + S$$

where Y represents income, C is consumption and S is savings.

A hypothetical consumption function for the economy is illustrated in the table in figure 9.5, which shows the planned levels of consumption and savings expenditure at each level of income.

The level of spending (on consumption and saving) is shown on the vertical axis, and disposable income is shown on the horizontal axis. The 45° line is equidistant between the two axes, and thus shows points where planned expenditure equals total income. When the consumption function intersects the 45° line, the economy is in 'equilibrium'. This means that the level of income, output and spending in the economy is in balance – the level of economic activity is stable.

At point 'x' in figure 9.5, total consumption expenditure (C) is $150 billion, which equals the level of income. This is sometimes referred to as the 'breakeven' point. At levels of income greater than $150 billion, consumption is less than income and saving is positive. For example, at an income level of $300 billion, consumption is $240 billion and saving equals $60 billion. At a lower level of income, such as $100 billion, consumption ($120 billion) exceeds income, which means that savings is negative. This is referred to as 'dissaving'.

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The consumption function can be expressed as a linear (straight line) equation:

$$C = a + bY$$

The right hand side of the equation has two parts. The variable 'a' is the vertical intercept – the point where the consumption function meets the y-axis. This is described as 'autonomous' consumption. This means there would be some level of aggregate spending even if consumers had no income (presumably households would draw on savings or claim transfer payments from government). The second part of the right hand side (the variable 'b') is the rate at which consumption (C) changes when income (Y) rises – the slope of the consumption line.

In figure 9.5, the equation for the consumption function is $C = 60 + 0.6Y$. This means that if income was zero, the autonomous level of consumption in the economy would be $60 billion. For every $1 increase in disposable income, households will spend 60 cents, and save 40 cents. The spending fraction ($C = 0.6Y$) is known as the marginal propensity to consume (MPC). The MPC is the proportion of any change in income that is spent on consumption. It can be represented as an equation:

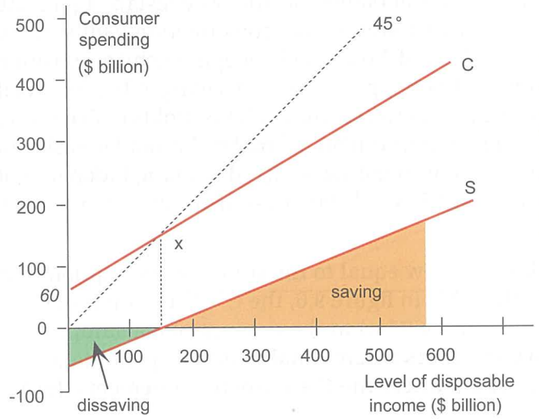
$$MPC = \Delta C / \Delta Y$$

where the symbol Δ means 'change in'.

### Figure 9.5 The consumption function

| Yd | = | C | + | S |
|---|---|---|---|---|
| 0 | = | 60 | + | - 60 |
| 100 | = | 120 | + | - 20 |
| 200 | = | 180 | + | 20 |
| 300 | = | 240 | + | 60 |
| 400 | = | 300 | + | 100 |
| 500 | = | 360 | + | 140 |
| 600 | = | 420 | + | 180 |

figures in $ bn




*The Keynesian consumption function shows that consumption increases as disposable income rises, but not by as much as the increase in income. This is shown in the hypothetical table at left. Note the assumption that income can only be spent or saved (i.e. Y = C + S).*

*The C function can be described in an equation [C = a + bY], where a represents the autonomous component of consumption (here $60 billion), and b represents the marginal propensity to consume (MPC). The MPC is the slope of the C line (in this case MPC = 0.6). The equation for the C function in this diagram is C = 60 + 0.6Y.*

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Similarly, the fraction of any change in income that is saved is known as the marginal propensity to save (MPS). In our example, the MPS is 0.4. The MPS is the change in savings divided by the change in income:

$$MPS = \Delta S / \Delta Y$$

Given that our simple model assumes that all income is either spent or saved, then the MPC and the MPS must add to one:

$$MPC + MPS = 1$$

The size of the MPC depends on the attitude of consumers to spending and saving. If the MPC increases, then the consumption function will be a steeper line. For example, if the MPC were to equal 0.7, consumers would spend 70 per cent of extra income, and save the rest (30 per cent), so the MPS would be 0.3. A consumption function having a slope of 0.9 would be steeper again, as households would spend a greater proportion of any increase in income.

*What happens to MPC, MPS, APC and APS, as income rises? The MPC and MPS do not change - they are constant. But the APC and the APS do change. In figure 9.5, when Y = 300, C = 240 and S = 60. The APC is 0.8, and the APS is 0.2 At Y = 600, C = 420 and S = 180. The APC has fallen to 0.7, and the APS has risen to 0.3.*

The overall proportion of income spent or saved at any level of income is known as the average propensity to consume (APC) and the average propensity to save (APS). The APC is defined as the proportion of total income spent on consumption. The APS is the proportion of total income that is saved. The APC and the APS must also sum to one. In our example in figure 9.5, when income is 200, consumption is 180 and saving is 20. So the APC equals 0.9, while the APS equals 0.1. Notice what happens as income rises. At an income level of 400, consumption has risen to 300 and the APC has fallen to 0.75. The APS is now 0.25. Thus, as income rises, the APC falls and the APS rises, even though the marginal rates of consumption and saving stay the same!

## Introducing the financial sector

The consumption function is the cornerstone of the Keynesian aggregate expenditure model. We now relax the assumption that consumers can only spend or save their income. Figure 9.5 showed how much people wish to consume and save at each level of income. What happens to those savings? The financial sector acts as an intermediary to channel the savings of households to firms who can draw on these funds to finance investment. To make the model easier to understand, we assume that investment spending is a fixed amount, independent of the level of income. We assume that, in total, business firms plan to invest $60 billion.

The level of aggregate expenditure is now equal to the sum of consumption plus investment: AE = C + I. In the table in figure 9.6, the C + I column is derived by adding the amount of investment ($60 bn) to the amount of consumption at each level of income. Equilibrium occurs where total planned spending (C + I) equals output or income. This occurs where the C + I function intersects the 45° line (see point b on the model). Equilibrium can also be defined as the income level where planned saving by households equals planned investment by firms. The equilibrium level of income in our model is $300 billion (Ye).



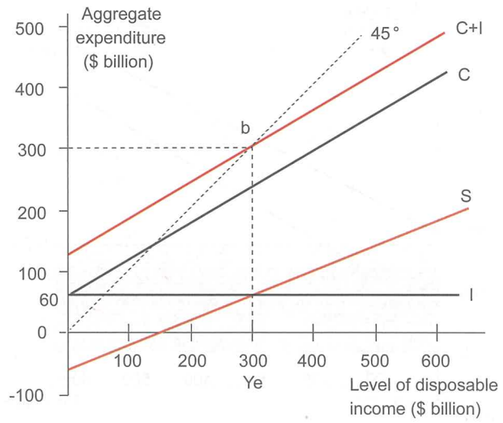


If the level of income is either above or below equilibrium, then planned spending will not equal output and firms' inventories will change, signaling the firms' managers to either increase or decrease production. The level of output and income will automatically move towards the equilibrium level. At an income level of $400 billion, for example, planned spending equals $360 billion. Firms will have unsold output (inventories) of $40 billion – inducing them to cut their output in the next time period, leading in a fall in income. In the model, the C + I function is below the 45° line when disposable income is $400bn.

On the other hand, if the level of income was $200 billion (below the equilibrium level) total planned spending would equal $240 billion. In the model, the C + I function is now above the 45° line. This means that firms will have sold all their current output and will have to sell $40 billion worth of output from inventories. Inventories will thus fall, and firms will react by increasing production in the next time period. Rising production will increase the level of income earned.

### Figure 9.6 The model with savings and investment

| Yd | C | S | Ip | C+Ip | Change in Inventories | Effect on Output |
|---|---|---|---|---|---|---|
| 0 | 60 | -60 | 60 | 120 | -120 | Increase |
| 100 | 120 | -20 | 60 | 180 | -80 | Increase |
| 200 | 180 | 20 | 60 | 240 | -40 | Increase |
| **300** | **240** | **60** | **60** | **300** | 0 | **No change** |
| 400 | 300 | 100 | 60 | 360 | 40 | Decrease |
| 500 | 360 | 140 | 60 | 420 | 80 | Decrease |
| 600 | 420 | 180 | 60 | 480 | 120 | Decrease |




*This model extends the consumption function by adding planned investment. Aggregate expenditure is now equal to C + I.*

*Equilibrium occurs where C + I intersects the 45° line. The equilibrium level of income is $300bn, and S = I at $60bn. At equilibrium, there is no addition to, or withdrawal from, inventories.*

Only when real GDP is $300 billion, where planned spending matches output, can the economy be in equilibrium. In figure 9.6, this is where the C + I function cuts the 45° line. It is important to understand the key role that inventories (unplanned investment) play in 'pushing' the economy towards equilibrium:

- when the C + I line is below the 45° line, the level of savings is greater than the level of planned investment, so inventories rise, firms reduce production, and income earned from production must fall;
- when C + I is above the 45° line, investment is greater than savings. Inventories fall, firms increase production and employ more resources, creating more income.

## The full aggregate expenditure model

We now relax the assumption that the economy has no government or overseas sectors. Figure 9.7 reflects the addition of government spending and net exports into the model:

$$AE = C + Ip + G + (X - M)$$

### Figure 9.7 The Keynesian model

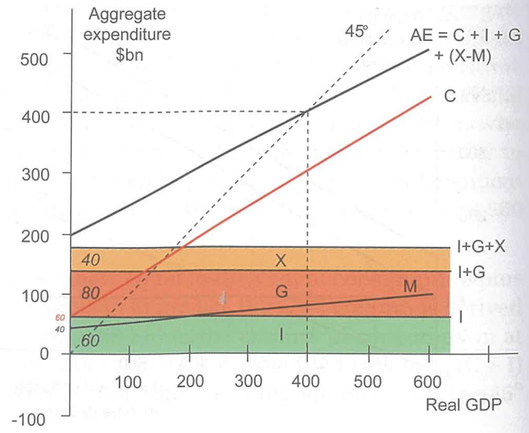
| Real GDP | C | Ip | G | X | M | AE | Δ Inventories |
|---|---|---|---|---|---|---|---|
| 0 | 60 | 60 | 80 | 40 | 40 | 200 | -200 |
| 100 | 120 | 60 | 80 | 40 | 50 | 250 | -150 |
| 200 | 180 | 60 | 80 | 40 | 60 | 300 | -100 |
| 300 | 240 | 60 | 80 | 40 | 70 | 350 | -50 |
| **400** | **300** | **60** | **80** | **40** | **80** | **400** | **0** |
| 500 | 360 | 60 | 80 | 40 | 90 | 450 | + 50 |
| 600 | 420 | 60 | 80 | 40 | 100 | 500 | +100 |

*figures in $bn*

*The level of planned aggregate expenditure (AE) at each level of income is calculated by adding C + I + G + (X-M).*

*It is assumed that I, G and X are autonomous (independent of the level of real GDP), but that M is a function of income. The equilibrium level of real GDP is $400bn. At this point planned spending matches actual production.*

*At income levels above $400bn, total spending < output, and inventories increase. At income levels below $400bn, total spending > output, and inventories decrease.*








Government expenditure (G) is assumed to be a fixed amount and independent of the level of real GDP (G = $80 billion). We make the same assumption for exports – X is a fixed amount of $40 billion. Imports, however, are assumed to increase with the level of disposable income. In our model, import spending increases by $10 billion for each $100 billion increase in GDP . This is the 'marginal propensity to import'.

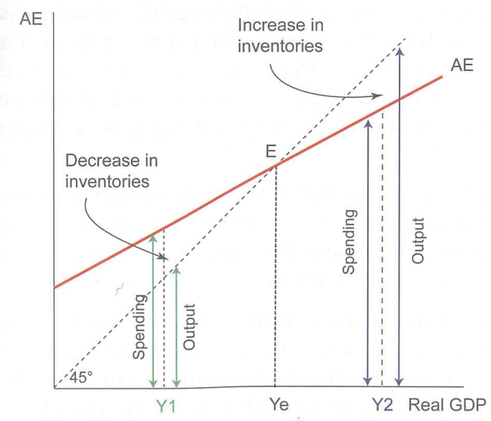
We can now derive the total amount of aggregate expenditure by adding the individual types of expenditure (C, Ip, and G) and adding net exports (X-M). In the table above figure 9.7, aggregate spending equals real GDP at $400 billion. This is the equilibrium level of aggregate expenditure – all current production is sold and there is no change to inventories.

The diagram in figure 9.7 is the complete AE model. We now label the horizontal axis 'real GDP'. The equilibrium level of income occurs when aggregate planned expenditure equals GDP – the point where the AE function intersects the 45° line. At this point, GDP and AE are equal at $400 billion.

If real GDP is below $400 billion, total spending exceeds output and inventories fall. Firms will respond by hiring additional resources in order to increase output. Output will rise until $400 billion of goods and services are produced. When this occurs, there are no unplanned changes in the level of inventories. This meets the definition of equilibrium – no tendency for change in the levels of income or output at that point in time. At higher levels of real GDP, total spending is less than output so inventories rise, signalling firms to cut back their production.

It is useful to recap on the meaning of macroeconomic equilibrium. As depicted in figure 9.8, equilibrium occurs when total planned spending equals total output. This is the point where the AE function crosses the 45° line – at point E, corresponding with the level of income Ye. At a lower level of income such as Y1,

### Figure 9.8 Macroeconomic equilibrium




*Macroeconomic equilibrium occurs when total planned spending equals production - when the AE function crosses the 45° line (point E).*

*When spending equals output, there is no change to inventories.*

*When spending > output, inventories decrease and the level of income rises.*

*When spending < output, inventories increase and the level of income contracts.*

planned spending is greater than output and there is a decrease in inventories. Firms will increase aggregate output, so income and employment will rise. At an income level such as Y2, planned spending is now less than output so that there is an increase in inventories. Again this will automatically lead to a decrease in production and the level of output and income will fall back to the equilibrium level Ye (point E).

Is there anything special about the equilibrium level of income? Not really – it simply means that the level of income is stable. It doesn't necessarily imply that the economy is operating at its full potential.

## Changes in expenditure – the multiplier

Changes occur from time to time in the components of aggregate expenditure. For example, the following events would result in a higher level of AE – the red line in the model would shift upwards at all levels of disposable income:

- a rise in retail spending due to an increase in consumer confidence;
- an increase in revenue from wheat exports; or
- an increase in business investment associated with clean energy projects.

To understand how such changes affect the rest of the economy, it is necessary to understand that new expenditure does not just have a once-off impact on the economy. Because 'one man's spending is another man's income', any addition to (or reduction of) the level of spending in the economy will have far-reaching effects on aggregate levels of income. Keynesian theory builds a model known as 'the multiplier' to explain this process.

Initially, we assume our economy has just three sectors – households, firms, and the financial sector. Aggregate expenditure therefore consists of consumption plus investment. Assume a mining company decides to spend $10 billion to develop a mine site and rail line in Western Australia. The new investment creates income for contractor firms and their employees, including engineers, architects and construction workers. These households then spend part of that income on goods and services including food, clothing, rent and entertainment. This spending will flow on to other people through the circular flow of income. The final impact of the new spending is thus likely to be much greater than the initial investment spending.

The multiplier refers to proportion by which income will rise following an initial change in spending. If an increase in investment of $10 billion caused the level of income to rise by $25 billion, the value of the multiplier would be 2.5 – that is, the final impact on income is 2.5 times the new investment.

The following example (see figure 9.9) shows the multiplier process and how the marginal propensity to consume determines its final impact. The new investment in the mining venture ($10 billion) initially creates new income of $10 billion for firms and people working on the project. Assume the MPC is 0.6, so households





spend $6 billion on goods and services and save the other $4 billion. The $6 billion of spending will flow on to other households in the next period of time. In period 2, 60 per cent of this income will be spent ($3.6 billion) and 40 per cent ($2.4 billion) saved. In the third round of spending, new income is $3.6 billion, of which $2.16 billion will be spent, and $1.44 billion saved. The cycle of 'one person's spending creating another's income' will continue over many periods until the incremental change in income is zero.

Figure 9.9 shows the progressive impact of the new investment on the level of income in the economy. After four periods of the income/spending cycle, $21.76 billion of extra income has been created from the initial increase in investment of $10 billion. If we follow the process to the end (through many time periods) we can show that the total change in income caused by the initial investment of $10 billion will be $25 billion. We can now derive the value of the multiplier (using the symbol 'k'). The multiplier is the amount by which real income or GDP changes after an initial change in expenditure. The value of the multiplier in the example we have developed above would be:

$$k = \Delta Y / \Delta I$$
$$= 25/10$$
$$= 2.5$$

The value of the multiplier is determined by the marginal propensity to consume. The following formula can be used:

$$k = 1/1 - MPC \quad (\text{or, } k = 1/MPS)$$

Using this formula, and assuming MPC equals 0.6, then the multiplier equals 2.5:

$$k = 1 / (1 - 0.6)$$
$$= 1/0.4 = 2.5$$

### Figure 9.9 The multiplier over several rounds of spending

| | | | Y | = | C | + | S |
|---|---|---|---|---|---|---|---|
| Time period | | | *assumes MPC = 0.6* | | | | |
| new I ($10) | 1 | *creates new Y* | 10.00 | = | 6.00 | + | 4.00 |
| | 2 | | 6.00 | = | 3.60 | + | 2.40 |
| | 3 | | 3.60 | = | 2.16 | + | 1.44 |
| | 4 | | 2.16 | = | 1.30 | + | 0.86 |
| *after 4 time periods* | | | ∑Y | = | ∑C | + | ∑S |
| | | | *21.76* | = | *13.06* | + | *8.70* |
| after n... time periods | | | ∑Y | = | ∑C | + | ∑S |
| | | | 25.00 | = | 15.00 | + | 10.00 |

figures in $bn

*The multiplier shows how one person's spending creates another person's income. An initial investment of $10bn creates new income, which is either spent or saved. The portion that is spent creates income for others in the second time period. This is also spent or saved. The total new income created by the initial investment can be determined using the formula $\Delta Y = k \times \Delta I$ (i.e. 2.5 x $10bn = $25bn). The symbol $\Sigma$ (sigma) means 'the sum of'.*

| MPC | MPS | Multiplier |
|---|---|---|
| 0.25 | 0.75 | 1.33 |
| 0.4 | 0.6 | 1.67 |
| 0.5 | 0.5 | 2 |
| 0.6 | 0.4 | 2.5 |
| 0.75 | 0.25 | 4 |
| 0.8 | 0.2 | 5 |

What would happen if the MPC increased? This would increase the 'respending' effect from a given change in investment, so the size of the multiplier would rise. For example, an MPC of 0.75 would mean that the multiplier would be 4. Small changes in the MPC can have a dramatic effect on the size of the multiplier, as shown in the sidebar. As the MPC increases (MPS decreases), the multiplier increases. The multiplier always has a value greater than one, unless the MPC is zero!

What determines the value of the marginal propensity to consume? It depends on attitudes to spending and saving, and may change over time. Remember that the MPC is an average across all households in the economy.

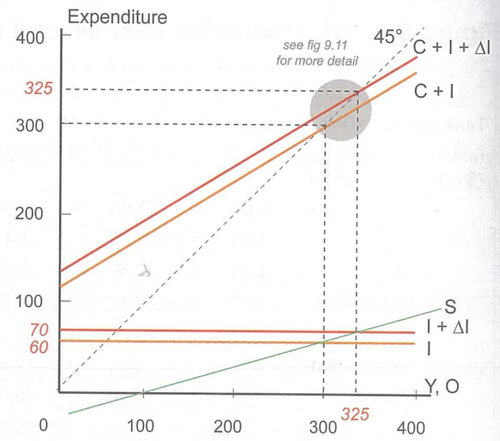
The multiplier principle can be illustrated using the Keynesian aggregate expenditure model. Figure 9.10 demonstrates how an increase in investment causes the equilibrium level of income to increase by a much larger amount. Initially the economy is in equilibrium with income Y = 300. Saving and investment are equal at 60. Assume that planned investment increases by 10 (from 60 to 70). The investment schedule will shift up to $I + \Delta I$. The C + I function will also shift upwards by the increase in investment. The level of income in the economy expands in successive rounds of new spending which generates new income. Each change in income will induce new spending via the marginal propensity to consume. Figure 9.11 shows the multiplier process in more detail, illustrating the 'steps' as successive increases in income induce new rounds of spending. Eventually, the initial increase in investment of 10 raises the equilibrium level of income to 325 – an increase of 25. In other words, the multiplier is 2.5.

**Figure 9.10 The multiplier effect**

*Initial equilibrium occurs at Y = $300 bn with savings equal to investment at 60. Firms then decide to increase I by $10 bn (shown on the diagram as I + ΔI) to $70bn. This extra $10bn sets off a spending /income cycle: "one man's spending is another man's income".*

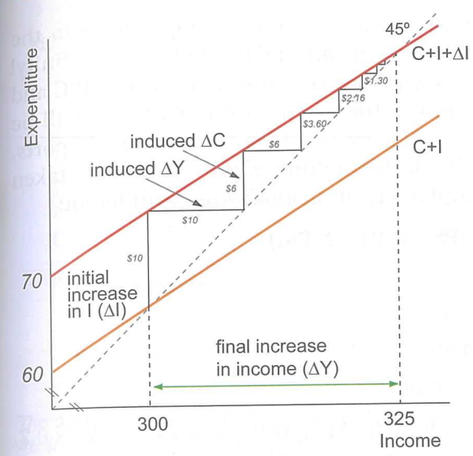
*Over time, income increases from $300bn to $325bn - an increase of $25bn. The value of the multiplier (ΔY / ΔI) is 2.5. The initial increase in investment has resulted in a multiple change in income.*

*The shift to the right shown on the x-axis is greater (325 - 300) than the change in investment (70 - 60) shown on the y-axis.*








*This diagram shows the multiplier stages in greater detail – what happens within the shaded circular area in figure 9.10.*

*The initial increase in investment increases income (the 'tread' on each of the steps) which then induces increases in consumption (the 'rise' in the steps).*

*A $10 billion autonomous rise in investment will, after a series of 'steps', create $25 billion more income.*

**Figure 9.11 The multiplier 'steps'**

There are many instances in which the multiplier principle would have an impact on the Australian economy. Remember that the multiplier process applies to any autonomous change in expenditure – which could be a change in investment, government spending or exports. Examples include:

- resource projects in the Pilbara region of WA;
- government spending on new railways; or
- the increase in the Jobseeker allowance during the pandemic.

The multiplier process also applies for any decrease in autonomous spending. The closure of a bank in a rural town would have a ripple effect on other services. As bank employees moved, supermarket turnover would fall, as would cafe sales and doctors' visits. On a wider scale, the global financial crisis (GFC) in 2008–09 and the pandemic in 2020 both led to a fall in investment spending and a fall in GDP.

## The size of the multiplier

The size of the multiplier is determined by the factors that affect the marginal propensity to consume. If the MPC is greater than zero but less than one, the

Economic skills

**Investigation - MPC and MPS - class survey**

Feeling generous, your teacher has decided to give everyone in your economics class $20. She then asks every student how much of their windfall they will spend, and how much they will save. Don't forget that economics is a social science, so you should expect a range of responses, none of which is 'right' or 'wrong'. Tabulate the results in two columns (C and S), asking each student for their reasons (e.g, a student might say "I decided to spend $18 and save $2 because I need clothes at the minute"). Calculate the average proportion of the first column (e.g. $16 out of $20 will be 0.8). This is the class MPC. What should the other column be called? Could the results be different in 5 years time?

multiplier will have a value greater than one. Is there an upper limit to the multiplier? If the MPC was equal to one, then the multiplier would equal infinity! In reality, there are a number of factors which restrict the value of the MPC and therefore reduce the size of the multiplier. The extent of the multiplier will be influenced by the size of leakages associated with savings, taxation and imports. Each of these leakages reduces the size of the multiplier. When these are taken into account, the formula for the multiplier equation looks slightly different:

$$k = 1 / (MPS + MPT + MPM)$$

where:

- MPS = marginal propensity to save
- MPT = marginal propensity to tax
- MPM = marginal propensity to import

Assuming for example that the MPS is 0.2; the MPT is 0.3 and the MPM is 0.2, the combined leakages would be 0.7 of new income. This would imply that the multiplier would be

$$k = 1 / 0.7 = 1.43$$

Can we calculate the value of the multiplier in the Australian economy? Estimates show that while it varies over the course of the business cycle, its average value is between 1.5 and 2.5. This is useful information for governments when formulating policy tools for different phases of a business cycle.

## Aggregate expenditure and the business cycle

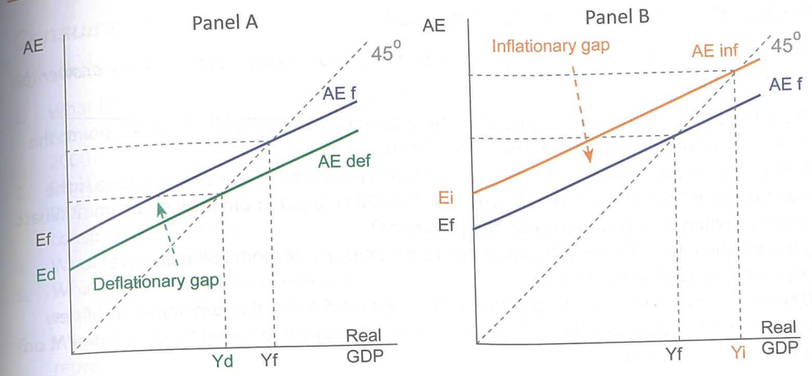
The Keynesian aggregate expenditure model can be applied to show the economic impact of changes in any of the components of aggregate expenditure on the business cycle. In panel A of figure 9.12, the blue line AEf represents the level of aggregate expenditure necessary to fully employ resources, including labour. If there is an autonomous decrease in expenditure, this will be multiplied to result in Yd – a lower level of real GDP represented by the green line AE def. In the Keynesian model, the difference between the current level of spending and that required to achieve full employment (the economy's potential GDP) is called a deflationary gap. The fall in expenditure (which could have endogenous or exogenous causes) illustrates the contractionary phase in the business cycle.

When aggregate expenditure rises again, the economy is in the expansionary phase of the business cycle. Output will increase but inflationary pressure will occur as output approaches the full employment level of income (the economy's potential at this point in time).

Panel B shows what is called an inflationary gap. The orange line AE inf is higher than the full employment level of spending denoted by AEf. The economy has expanded beyond its potential so demand for inputs and final goods forces up the price level.








*The business cycle can be modelled using the Keynesian aggregate expenditure model. Falls in AE (panel A) bring about a contraction, as growth in real GDP slows from Yf to Yd. Rises in AE, on the other hand, are associated with an expansion - growth in real GDP increases from Yf to Yi.*

**Figure 9.12 The Keynesian model and the business cycle**

### Worksheet 1 - aggregate expenditure

*Read the aggregate expenditure sections to answer the following questions.*

1. List the components of aggregate expenditure.
2. Define the term 'consumption'. Provide three examples each of durable and non-durable consumption.
3. Define the term 'investment'.
4. What is the meaning of the term 'expectations'? Carefully explain how 'expectations' might affect the aggregate level of durable consumption; of investment?
5. The cost of credit (interest rates) affects aggregate levels of consumption and investment for two reasons. Carefully explain those reasons.
6. Draw an 'investment demand function', then explain what would cause a movement along that function and what would cause a shift of the whole function (right or left).
7. Explain why the 'elasticity of investment demand with respect to interest rates' might vary over time.
8. Distinguish between automatic and discretionary forms of government spending.
9. What factors influence spending by overseas residents on Australian exports?
10. Draw up a table that summarises the determinants of each component of aggregate expenditure. Highlight what you believe are the two most important factors affecting each element. Provide an example of a recent instance of each influence.