

rate of return to obtain a portfolio with a lower but more predictable rate of return.

- 10 A motive for holding money reflecting the fact that payments and receipts are not perfectly synchronized.
- 11 A key indicator used as an input to frequent decisions about where to set interest rates.
- 12 The variables over which the central bank exercises day to day control.
- 13 The body responsible for the regulation of UK banks.
- 14 The interest given up by holding money rather than bonds.

Exercises

- 1 The following items comprise the assets and liabilities of the Bank of England in October 1999:

	£ billion
Government securities (Issue Department)	13.4
Public deposits	0.2
Advances	26.1
Government securities (Banking Department)	1.3
Notes in circulation	24.8
Bankers' deposits	1.3
Reserves and other accounts	28.6
Other securities (Issue Department)	11.4
Other assets (Banking Department)	2.7

Source: <http://www.bankofengland.co.uk/mfsd/>

Identify each item as an asset or a liability and complete the balance sheets for the two departments of the Bank.

- 2 In a given economy, the public chooses to hold an amount of cash equal to 40 per cent of its bank deposits. The commercial banks choose to hold 5 per cent of deposits in the form of cash in order to service their customers. The stock of high-powered money is £12 million.
 - (a) What is the size of the money supply?

Each of the following four situations represents an attempt by the monetary authorities to reduce the size of money supply. In each case, assume that the banking system is initially as described above.

 - (b) What would be the size of money supply if the central bank imposed a 10 per cent cash ratio on the commercial banks?
 - (c) What would be the size of money supply if the central bank raised its discount rate to such a penalty rate that the banks choose to hold an extra 5 per cent of deposits as cash?
 - (d) What would be the size of money supply if the central bank called for Special Deposits of an amount corresponding to 5 per cent of bank deposits?

- (e) What would be the reduction in money supply if the central bank undertook open market operations to reduce the stock of high-powered money by £1 million?

- 3 In what way would you expect each of the following items to affect the demand for real money balances?

- (a) An increase in real income.
- (b) An increase in confidence about the future.
- (c) An increase in the opportunity cost of holding money.
- (d) A fall in nominal interest rates.
- (e) An increase in the price level.
- (f) An increase in the interest differential between risky assets and time deposits.
- (g) An increase in uncertainty concerning future transactions.
- (h) A fall in the frequency of income payments – for example, a switch from weekly to monthly payment.
- (i) An increase in the stock of high-powered money brought about by open market operations by the Bank of England.

- 4 Table 23-1 overleaf provides information concerning nominal national output, M1, £M3, and interest rates, comparing the years 1979 and 1983 in the UK, a period in which money supply was a well publicized policy target.

- (a) Calculate an index of real GDP for 1983 based on 1979=100.
- (b) Explain how you would expect real money holdings to have changed between 1979 and 1983 on the basis of the evidence on GDP, prices, and the interest rate.
- (c) Calculate an index of real M1 and real £M3 for 1983 based on 1979=100 and discuss whether your answer is consistent with your reasoning in part (b) of the exercise.
- (d) Why is it more difficult for the Bank to control real money stock than it is to control nominal money stock – and why does it matter?

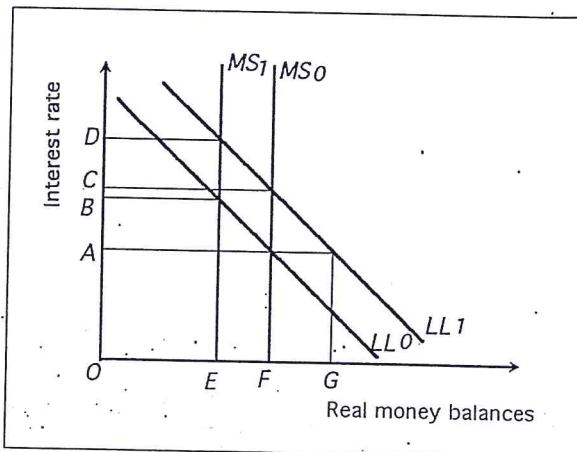


Figure 23-1 Short-run cost curves for a perfectly competitive firm

Table 23-1

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Table 23-1 Analysing money holdings 1979-83

	1979	1983
Nominal money holdings M1 (end 1979 = 100)	100	151.5
Nominal money holdings £M3 (end 1979 = 100)	100	178.0
Nominal GDP (1979 = 100)	100	137.5
GDP deflator (1979 = 100)	100	139.7
Nominal interest rate on 3-month Treasury bills (%)	16.65	9.28

Source: ONS, *Economic Trends Annual Supplement 1986*, HMSO, and Bank of England *Quarterly Bulletin June 1984*

- 5 Figure 23-1 shows conditions in the money market. *LLO* and *LL1* are money demand schedules; *MSO* and *MS1* represent alternative real money supply schedules. In the initial state, the money market is in equilibrium with the demand for money *LLO* and money supply *MSO*.
- Identify equilibrium money balances and rate of interest.
 - Suggest why it might be that the money demand schedule shifted from *LLO* to *LL1*.
 - Given the move from *LLO* to *LL1*, suppose that no adjustment has yet taken place: what is the state of excess demand/supply in the bond market?
 - How does this disequilibrium in the bond market bring about adjustments in the money market?
 - Identify the new market equilibrium.
 - Suppose that money demand remains at *LL1*: what measures could the authorities adopt to move money supply from *MSO* to *MS1*?
 - Identify the new market equilibrium.
- 6 Which of the following situations would entail an increase in the transactions demand for money?
- A general rise in consumer prices.
 - An expected general rise in consumer prices.
 - The extension of value-added tax to goods which were previously zero-rated.
 - An increase in the level of real income.
 - An increase in the standard rate of income tax.
 - A fall in interest rates.
- 7 In which of the following circumstances would a rise in interest rates be expected?
- A fall in money supply.
 - An increase in money demand.
 - A rise in liquidity preference.
 - A fall in the price of bonds.
 - An increase in consumer prices.
- 8 Use a diagram to explain how the authorities may attempt to control money stock through interest rates. Comment on the problems of this procedure.
- 9 Explain how the authorities may attempt to influence interest rates by controlling money stock. Comment on the problems of this procedure.

True/False

- There is no possibility that the Bank of England can go bankrupt because it can always meet withdrawals by its depositors by printing new banknotes a little more quickly.
- The central bank can reduce the money supply by reducing the amount of cash that the commercial banks must hold as reserves.
- Open market operations are a means by which the Bank alters the monetary base, banks' cash reserves, deposit lending, and the money supply.
- A reverse repo is where you repossess your car from the loan shark.
- The initiation of the London repo market increased M4 by about £6 billion in early 1996.
- When you've tried everywhere else to get money for your holidays, you go to the lender of last resort.
- Money is a nominal variable, not a real variable.
- The existence of uncertainty increases the demand for bonds.
- The best measure of the opportunity cost of holding money is the real interest rate.
- The central bank can control the real money supply with precision more easily than the nominal money supply.
- An excess demand for money must be exactly matched by an excess supply of bonds: otherwise people would be planning to hold more wealth than they actually possess.
- The central bank can fix the money supply and accept the equilibrium interest rate implied by the money demand equation, or it can fix the interest rate and accept the equilibrium money supply implied by the money demand equation; but it cannot choose both money supply and interest rate independently.

Economics in Action

Greenspan runs out of road as rates turn negative

(Adapted from *The Independent*, 12th December 2001)

With demand in the US economy still deep in the doldrums, the US Federal Reserve has little option but to keep cutting interest rates until the medicine works, but for how much longer can the Fed carry on propping up the US and world economy in this way? The point hardly needs making that with short-term rates now at just 1.75 per cent, Alan Greenspan, the Fed chairman, is speeding down a dead end street that has an impenetrable brick wall at the end of it. He's running out of road.

Since American inflation is quite a lot higher, the US economy is now in the almost unprecedented

spending, which increases aggregate demand and hence interest rates.

- 9 A curve which shows the different combinations of income and interest rates at which the goods market is in equilibrium.
- 10 A situation in which a reduction in direct taxation has no effect on aggregate demand because individuals realize that tax cuts now will be balanced by higher future taxes.

Table 24-1 Interest rates and the savings ratio

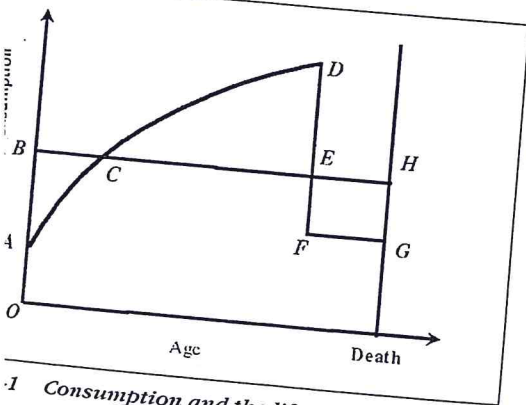
Year	Treasury bill rate (%)	Savings ratio (%)
1987	8.38	5.5
1988	12.91	3.9
1989	15.02	5.6
1990	13.50	7.4
1991	10.45	9.4
1992	6.44	11.5
1993	4.95	11.0
1994	6.00	9.4
1995	6.31	10.3
1996	6.26	9.5
1997	7.13	9.3
1998	5.63	6.4

Source: Economic Trends

Table 24-1 presents UK data on the savings ratio and interest rates for the period 1987-98.

- (a) Examine the data and try to detect any trends.
- (b) Economists often find that visual display of data is more revealing. Draw a graph, plotting the savings ratio and the Treasury bill rate on the same diagram against time.
- (c) Comment on the apparent relationship between the two series.

Figure 24-1 depicts income and consumption during the life-cycle. The path *ACDFG* represents the pattern of disposable income, increasing through the



1 Consumption and the life-cycle

individual's working life and then reducing to pension level on retirement. *OB* represents long-run average, or 'permanent', income. The individual aims at a steady level of consumption through life so as just to exhaust total lifetime income.

- (a) What level of consumption will be chosen?
 - (b) What does the area *ABC* represent?
 - (c) How is the area *ABC* to be financed?
 - (d) The area *CDE* represents an excess of current income over consumption. Why does the individual 'save' during this period?
 - (e) What does the area *EFGH* (during pension years) represent?
 - (f) How is *EFGH* financed?
 - (g) How would consumption behaviour be affected if the individual begins life with a stock of inherited wealth?
- (b) Discuss the effect of an increase in interest rates upon the present value of future income and upon consumption.

- 3 Figure 24-2 presents data for the UK relating to investment according to type of asset since 1965. Comment on the trends revealed by this data - both in terms of the overall trend in the data, and in terms of the pattern as between private and public sector investment.

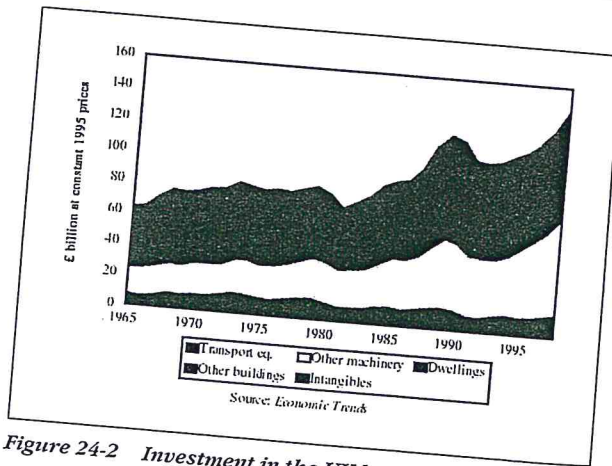


Figure 24-2 Investment in the UK by sector

Table 24-2 Investment opportunities

Project	Cost (£)	Expected rate of return (% p.a.)
A	4,000	6
B	6,000	12
C	4,000	2
D	5,000	20
E	3,000	10
F	10,000	16

- 4 A firm is appraising its investment opportunities. Table 24-2 shows the projects that are available. Assume that the firm has sufficient internal funds to

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- 7 Figure 24-3 closed econ

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undertake as many of these projects as it desires without borrowing.

- (a) Which projects will the firm undertake if the market rate of interest is currently 11 per cent per annum?
- (b) Which (if any) projects would be abandoned if the market rate of interest rose from this level by 2 percentage points? Why would this decision be taken?
- (c) Construct a schedule showing how much investment the firm will undertake at different values of the market rate of interest.
- (d) How would you expect this schedule to be affected by an increase in the 'business confidence' of the firm? Relate your answer to Table 24-2.

- 5 This exercise concerns the transmission mechanism of monetary policy in a closed economy with fixed prices. Suppose that there is a fall in the interest rate.
- (a) What effect does this policy have on the bond market?
 - (b) Outline the effect that this will have on consumption and investment.
 - (c) What does this imply for aggregate demand?
 - (d) How does this change in aggregate demand affect equilibrium output?
 - (e) How does this then affect money demand?
 - (f) What is implied for the rate of interest, and what further effects may follow?
 - (g) What do you expect to be the net effect on equilibrium output?

Please note: if you find that any links in this chain are obscure, you are advised to work through the question in conjunction with the commentary provided in the 'Answers and Comments' section.

- 6 This exercise concerns the crowding-out effects of fiscal policy in a closed economy with fixed prices. We begin this time with a cut in the rate of direct taxation. As with the previous question, if the chain does not make sense to you, follow the question in conjunction with the commentary.
- (a) How will the policy change initially affect disposable income and aggregate demand?
 - (b) What is the subsequent effect on equilibrium output?
 - (c) What implications does this have for the demand for real money balances?
 - (d) Given fixed money supply, how will this affect bond prices and interest rates?
 - (e) How will this feed through to affect aggregate demand?
 - (f) What is the effect on equilibrium output?
 - (g) Under what circumstances will this crowding-out effect be complete?

- 7 Figure 24-3 shows the *IS* and *LM* schedules for a closed economy with fixed prices.
- (a) *AB* and *CD* are the *IS* and *LM* schedules – but which is which?
 - (b) Comment on the equilibrium/disequilibrium

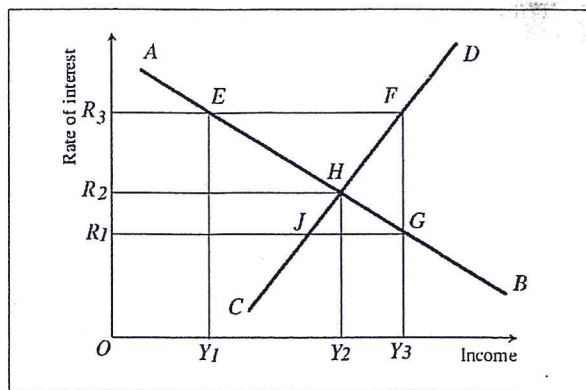


Figure 24-3 Equilibrium in the goods and money markets

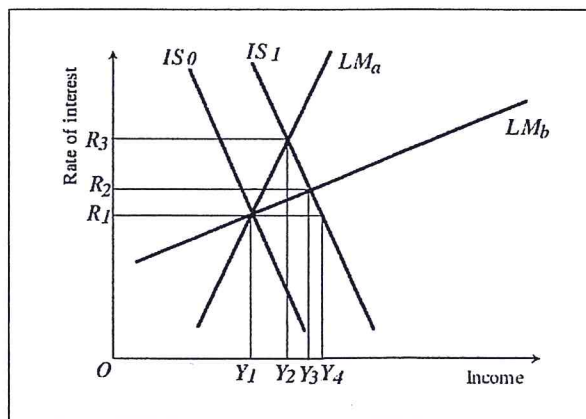


Figure 24-4 Fiscal policy

states of the goods and money markets at each of the points *E*, *F*, *G*, *H*, and *J*.

- (c) How would you expect the economy to react if it is at point *J*?
 - (d) For each of the following items, identify whether the *IS* or *LM* schedule is likely to shift – and in which direction (assume *ceteris paribus* in each case):
 - (i) An increase in business confidence.
 - (ii) An increase in nominal money supply.
 - (iii) A reduction in government spending.
 - (iv) A once-for-all increase in the price level.
 - (v) A redistribution of income from rich to poor.
 - (vi) An increase in the wealth holdings of households.
- 8 Figure 24-4 illustrates the effects of fiscal policy on equilibrium income and interest rate under alternative assumptions about the slope of the *LM* function. In each case, fiscal policy is represented by a movement of the *IS* curve from *IS0* to *IS1*.
- (a) What is the initial equilibrium income and interest rate?
 - (b) What could have caused the move from *IS0* to *IS1*?
 - (c) What would be the 'full multiplier' effect of the fiscal policy – that is, if the interest rate remains unchanged?

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- (d) If the fiscal policy is bond-financed and the *LM* schedule is relatively elastic, what is the effect of the fiscal policy on the equilibrium position?
- (e) If the fiscal policy is bond-financed and the *LM* schedule is relatively inelastic, what is the effect of the fiscal policy on the equilibrium position?
- (f) Identify the extent of crowding out in each of these situations.
- (g) What determines the elasticity of the *LM* schedule?
- (b) How could the authorities arrange policy in order to achieve the 'full multiplier' effect?
- 9 Figure 24-5 illustrates the effects of a restrictive monetary policy on equilibrium income and interest rate under alternative assumptions about the slope of the *IS* schedule. Monetary policy is here represented by a movement of the *LM* schedule from *LM₀* to *LM₁*.
- (a) What is the initial equilibrium income and interest rate?
- (b) What could have caused the move from *LM₀* to *LM₁*?
- (c) What is the effect of monetary policy on the equilibrium when the *IS* schedule is relatively steep?
- (d) What is the effect when *IS* is relatively flat?
- (e) What factors determine the steepness of the *IS* curve and hence the effectiveness of monetary policy?

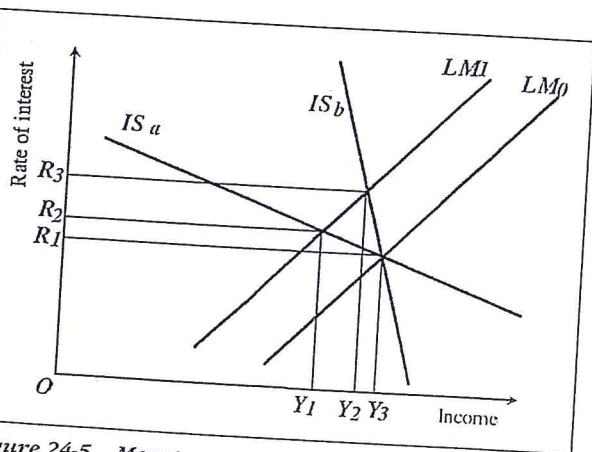


Figure 24-5 Monetary policy

It has been argued that individuals realize that reductions in direct taxation in the present will have to be offset by higher taxes in the future, which will have to be paid by them or by their children. This means that tax cuts do not really affect real income in the long run, so consumption plans should not be affected. This argument is known as 'Ricardian equivalence'. A number of objections have been raised to this line of argument, some of which are listed below. Which of them may have some validity?

- (a) Ricardian equivalence implies that government spending on roads has no effect, which is obviously false.

- (b) Future higher taxes may only be imposed after present taxpayers are dead.
- (c) There may be breakdowns in intergenerational transfers.
- (d) Marginal taxes drive distortionary wedges between the price paid and the price received, which may have supply-side effects.
- (e) There are capital market imperfections which effectively ensure that the government can borrow at a lower interest rate than private citizens.

- 11 Suppose you are given the following information: It is estimated that individuals who receive an increase in disposable income will treat 80 per cent of the increase as being likely to be sustained into the future, and the other 20 per cent as transitory. The marginal propensity to consume out of permanent income is 0.93. Consumption at a zero level of permanent income is estimated to be zero.
- (a) Give an algebraic expression for consumption.
- (b) Last year permanent income was £15 000. This year disposable income rose to £25 000. What is this year's estimate of permanent income?
- (c) What is the marginal propensity to consume out of current income?
- (d) What do these marginal propensities imply about the Keynesian multiplier for government expenditure and the effectiveness of fiscal policy? (Ignore taxes and the foreign sector.)

True/False

- 1 An increase in transitory income may not have any effect on current consumption.
- 2 Tax cuts lead to an increase in current consumption.
- 3 The interest rate is the only determinant of investment.
- 4 A higher interest rate increases the present value of the expected profit stream from an investment project and hence leads to an increase in investment.
- 5 Leasing arrangements and the use of the stock market to finance investment reduce the usefulness of the investment demand schedule in analysing investment decisions.
- 6 Changes in the rate of interest affect the position of the aggregate demand schedule in the income-expenditure model.
- 7 When we take into account the money market and interest rate effects, the multiplier on government spending is enhanced.
- 8 Movements along the *IS* schedule tell us about shifts in equilibrium income caused by shifts in the aggregate demand schedule as a result only of changes in interest rates.
- 9 The position of the *LM* schedule depends on the price level.
- 10 Monetary and fiscal policy affect aggregate demand through different routes but have very similar effects.

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- 10 The number of people without jobs who are registered as seeking a job.
- 11 Devices used by firms to vary labour input without affecting numbers employed.
- 12 The tendency for output and employment to fluctuate around their long-term trends.
- 13 A situation in which some people have chosen not to work at the going wage rate.
- 14 A situation in which some people would like to work at the going real wage but cannot find a job.

Exercises

1 This exercise explores the relationship between price and aggregate demand. Figure 25-1 shows an economy's *IS* and *LM* schedules. The economy begins in equilibrium with *IS₀* and *LM₀* being the relevant schedules.

(a) Identify equilibrium income, interest rate, and aggregate demand.

Suppose the price level rises to a new level:

(b) Which of the *LM* schedules is appropriate?

(c) In the absence of the real balance effect, identify the new equilibrium levels of income, interest rate, and aggregate demand.

(d) Explain and identify the influence of the real-balance effect.

(e) Repeat parts (b), (c), and (d) for a fall in price level from its original level.

(f) Explain why the price level affects the position of the *LM* curve.

(g) Draw a diagram to illustrate the macroeconomic demand schedule with and without the real balance effect.

2 Which of the following characteristics are valid for all points along the macroeconomic demand schedule?

Note: more than one response may be valid.

- (a) Planned spending equals actual output.
- (b) Planned demand for real money balances is equal to nominal money supply divided by the price level.

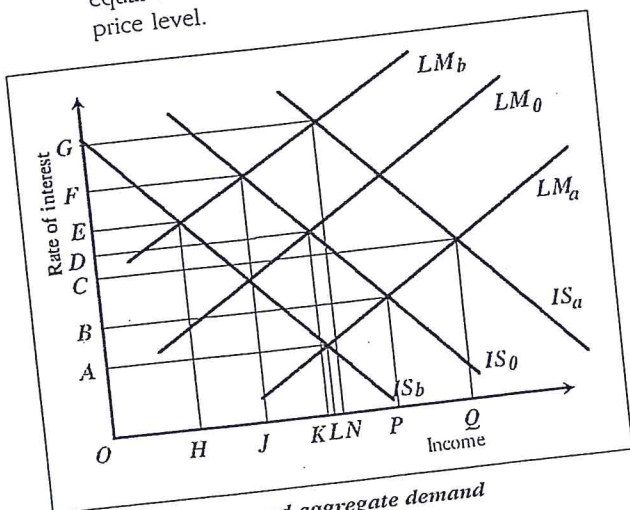


Figure 25-1 Price and aggregate demand

- (c) Demanders of goods receive the quantities they want to buy.
 - (d) The money market is in equilibrium.
 - (e) There is no disequilibrium in the goods market.
- 3 Figure 25-2 shows the labour market of an economy. *LD* is labour demand, *AJ* is the job acceptances schedule, and *LF* the labour force schedule.
- (a) What is the equilibrium real wage?
 - (b) Identify the level of employment and registered unemployment.
 - (c) In this situation, what is the natural rate of unemployment, and the quantity of involuntary unemployment?

Suppose the real wage is at *OA*:

(d) Identify the level of unemployment, registered unemployment, and quantity of involuntary unemployment.

(e) How will the market react?

Suppose now the real wage is at *OC*:

(f) Identify the level of employment, registered unemployment, and quantity of involuntary unemployment.

(g) How will the market react?

(h) Explain why there should be a connection between employment and aggregate supply.

(i) What are the implications for aggregate supply if the labour market is always in equilibrium?

4 This exercise examines monetary and fiscal policy, using the *MDS* and the aggregate supply schedule. Figure 25-3 shows two macroeconomic demand schedules (*MDS_a* and *MDS_b*) and the aggregate supply schedule (*AS*). First, we consider the effects of monetary policy in the classical model – specifically, an increase in nominal money supply.

(a) Identify the 'before' and 'after' *MDS*.

(b) What was the original equilibrium price and output?

(c) What is equilibrium price and output after the policy is implemented?

Next, consider fiscal policy – again in the classical model. Suppose there is a reduction in government expenditure:

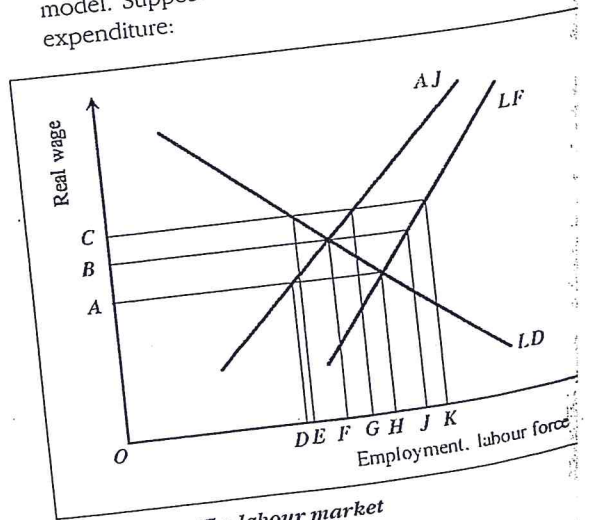


Figure 25-2 The labour market