Module 4

Government Macroeconomic Policy

Introduction

In this module, we will first discuss monetary and fiscal policy categories of stabilisation policies. We will examine the functions of money and bonds, and relationship between bond prices and interest rates. We will also examine money supply components, monetary policy and mechanisms that changes money supply and interest rates.

We will look into the influence of fiscal policy, the concepts of budget balance and national debt, and relationship between debt and deficit.

We will also focus on the concept of inflation and its determining factors together with "demand-pull" and "cost-push" types of inflation as well as controls of the money supply that leads to inflation. The responds of nominal interest rate to inflation and various costs associated with inflation and its danger will also be introduced.

Next, we will discuss labour force participation rate, unemployment rate, types of unemployment and the definition of full employment. Lastly, the impact of minimum wage laws and the relationship between inflation, unemployment and the Phillips Curve will be elaborated.

Upon completion of this module you will be able to:

Outcomes

- *make* a functional distinction between money and bonds.
- *explain* the determinants of money demand and bond demand.
- *state* the relationship between bond prices and interest rates.
- *name* the components of money supply, and give their functions.
- *describe* the mechanisms by which the central bank changes money supply and interest rates.
- *lay out* the implications when the central bank's states an explicit inflation target.
- *discuss* the practice of monetary policy.
- *describe* how fiscal policy influences the economy differently from monetary policy.

- *explain* the concept of the budget balance and the national debt.
- *outline* the relationship between the debt and deficits.
- *describe* how inflation is measured and how it affects nominal and real income.
- *explain* what factors determine inflation.
- *distinguish* between the states of inflation respectively labelled "demand-pull" and "cost-push".
- *describe* the causal chain happening with controls of the money supply that leads to inflation.
- *explain* how the nominal interest rate responds to the inflation rate.
- *distinguish* between a one-time increase in the price level and inflation.
- *explain* the various costs that inflation imposes.
- *explain* the danger of deflation.
- *describe* how the official unemployment rate is derived, the different types of unemployment and the definition of full employment natural unemployment.
- *distinguish* among the participation rate, unemployment rate and non- employment rate.
- *illustrate*, with an example, the impact of minimum wage laws on the unemployment rate.
- *outline* the concept of the trade-off between inflation and unemployment.
- *analyse* what is behind the Phillips Curve.

Terminology

Money: Anything that is generally acceptable as a means of payment.

Reserve ratio: Regulation that sets the minimum reserves each commercial bank must hold.

Crowding out: Expansionary fiscal policy causes interest rates to rise, thereby reducing investment spending.

Financial Markets, Monetary and Fiscal Policy

Introduction

Stabilisation policy attempts to influence the amounts spent and produced in an economy. The goal of such a policy is to keep the economy as close as possible to its potential output while maintaining price stability. Stabilisation policies fall into two categories; monetary and fiscal policy. This section starts with the task of exploring the complex and circumscribed relationship between monetary policy (its tools, its conduct and its goals) and interest rates as well as the economy. Although monetary policy has already been discussed in the context of inflation, the details of such policy and its relation with interest rates have yet to be fully examined.

Then you will examine the other tool of stabilisation policy: the fiscal policy. Fiscal policy involves changes in the government budget: expenditures, taxes, transfers, subsidies and so on. The issue of the budget deficit and debt is at the heart of fiscal policy. Governments whose hands are tied because of mounting national debts and persistent budget deficits are not able to use fiscal policy as an effective tool of stabilisation and, therefore, must rely entirely on monetary policy.

Money

Definition and functions of money

Money is anything that is generally acceptable as a means of payment. Money serves three separate functions in any economy. It provides:

- A means of payment (exchange).
- A store of (value) purchasing power.
- A unit (measure of value) of account.

Means of payment

The most important function of money is that it acts as a *means of payment* whenever items are bought and sold. Without money, market participants must trade one product for another, a transaction known as *barter*. Barters are costly means of carrying out a transaction in that they require *double coincidence of wants* between both parties. For example, if an economist wishes to get a haircut, he or she should be able to find a hair stylist who at the same time wishes to listen to a lecture in economics.

Money overcomes these problems. The benefits of money as a means of exchange are far-reaching: with it, people can minimise the time they spend finding others with whom they can buy and sell. Therefore, the use

of money not only facilitates transactions of goods and services but also raises living standards.

Store of value

Money's second function is providing a safe and accessible *store of value* (*wealth*). Money is normally an attractive store of purchasing power during the period between the time it is earned and the time it is spent.

There are both benefits and drawbacks associated with holding wealth as money. Money's major advantage is its liquidity, or the ease with which it can be turned into a means of payment. Assets are liquid when they can be quickly turned into money with little loss in value. All financial assets are liquid to some degree, but none as much as money, which is perfectly liquid by its very nature.

Recall, however, that for any economic choice, there is an opportunity cost. In this case, the cost of holding wealth in the form of money is the income sacrificed by not holding it in some other form. For example, someone who holds wealth by stashing thousands of ringgit under his/her mattress is sacrificing the income the wealth could earn if it were converted into a stock or bond. As a result, people hold wealth as money when the benefits of liquidity outweigh the income that could be earned by holding it in another form.

Unit of account

Money also provides buyers and sellers with a *unit of account*, or pricing standard that allows all products to be valued consistently against a common measure. In other words, it provides a point of comparison between various forms and types of automobile, spinach or economics lectures.

The supply of money

The supply of money is made up of currency and deposits with financial institutions.

Currency

Currency includes paper notes and coins such as currency bills, issued by the central bank.

Deposits

Deposits can be classified according to the conditions of their use. In general, the access the depositor has to his or her funds determines the interest rates paid on deposits. By and large, deposits are money too because they can be converted into money to settle debts.

There are several types of deposits. Some deposits give depositors immediate access to their money. They are called *demand deposits* and take the form of current and personal chequing accounts. This form of deposit is almost as liquid as money. Another popular form of deposit is known as *saving or notice deposits*, from which the depositor may

officially withdraw funds only after giving notice to the financial institution. In practice, most banks waive the right to require such notice.

Notice deposits typically pay a higher rate of interest but limit or exclude cheque writing. This distinction, however, has lost its relevance in most countries as newly introduced saving accounts have become as accessible as chequing accounts. A *term / fixed deposit* account is another form of deposit that entitles the holder to a higher rate of interest. A contractual condition of placing funds in a term deposit is that the depositor does not withdraw from that account for a specified period of time.

Equation (1) below defines the money supply in a generic form:

$$M_s = CU + D \qquad (1)$$

where CU stands for currency in the hands of public, D, deposits with banks, and M_s for the money supply.

Clearly, since there are several types of deposits, there are also several different measures of money. One commonly used measure known as M1, defines it as including:

1. notes and coins held by the public (CU), and
2. demand deposits with deposits-taking institutions.

The definition of money can be broadened to include a greater range of financial assets. For example:

M2 = M1 plus some notice deposits (personal or business).

M3 = M2 plus deposits with a wider range of financial institutions and a broader definition of deposits.

These definitions differ from one country to the next. However, you need not grapple with fine distinctions. It is sufficient to say that the borderline between money and non-money assets is arbitrary.

Credit cards and debit cards (also known as bank cards), though very popular in most countries, do *not* constitute money. A credit card is a money substitute, as is the debit card. They enable people to purchase products but they are not means of payments. For example, once money has been transferred from your bank account to that of the vendor to whom you presented your debit card, the card ceases to function as money. In other words, the card is not a medium of exchange that can be passed on from one person to another.

The demand for money

As discussed in Module 3, money is demanded for reasons primarily related to the first two functions of money: medium of exchange and store of value. The following motives are identified for demanding money:

1. *Transactional*: Money demanded for regularly scheduled transactions (purchase of goods and services, etc).
2. *Precautionary*: Money demanded against emergencies.
3. *Speculative* (motive) *demand for money*: Money demanded as a source of security against risks in bond markets.

The first two motives are directly related to the role of money as a medium of exchange whereas the last motive is related to the role of money as a store of value.

As discussed earlier, the main cost of holding money is the added income it could have earned if it had been converted into a higher-paying asset such as a bond. The added income is the rate of interest that is the measure of the forgone alternative (the opportunity cost).

Bonds

Focusing on the basic mechanism by which interest rates are determined, let us simplify by considering bonds as the sole alternative to money. The main distinguishing features of bonds as opposed to money are:

1. Money does not yield return (interest) whereas bonds do.
2. Money can be used for transaction but bonds cannot.

Bonds are formal contracts that set out the amount borrowed, by whom, for what period of time, and at what interest rate. Most bonds promise to pay an agreed-upon interest rate per period for the duration of the bond and also to pay back the bondholder the principal of the bond at its maturity. Bonds are also attractive assets because they can be easily bought and sold before their term has ended. This way, they offer liquidity as well as relatively high rates of return in exchange for the risk associated with changes in bond prices. Therefore, for individuals who hold wealth, bonds offer the likeliest alternative to holding money for individuals who have a favourable view of the trade-off between bonds' higher rates of return and higher risk. Bonds are the most popular way for governments and large business to raise funds.

There is a vast array of interest rates just as there is a wide range of credit instruments. **Table 4.1** presents annual average rates for a number of the Government of Canada's key interest rates. The rates in this table show interest on short and long-term instruments.

Maturity	Rates
2 year	3.87
3 year	3.94
5 year	3.98
10 year	4.09
Long term (30 year)[3]	4.18

Table 4.1 Government of Canada benchmark bonds yields (December 2007)

Apart from differences in their maturity (their term until they expire) bonds also vary in their extent of following characteristics.

1. *Default risk*: The risk that the loan will be paid back at all or on time. The greater this risk, the higher the "risk premium" included in the interest rate. Loans of similar maturity can be classified according to their risk with the riskier ones earning higher interest rates. Government bonds of major industrialised countries tend to be free of default risk. The contrasting side of corporate bonds, which is regarded as risky, is that they offer a higher risk premium.
2. *Inflation expectations*: The most important component of interest rates is the inflation expectation premium. Inflation – the loss of purchasing power – is the greatest enemy of interest-bearing wealth. For example, average 5 per cent inflation per year over a five-year period means that the purchasing power of the principal paid back after the five years is only 78.4 per cent of what it was at the beginning of the loan. The following section discusses the concept of the Fisher relationship. According to that relationship, since the future inflation rate is not known with certainty at the time the loan is made, the premium reflects the inflation expectations of the lender and borrowers (Nominal rate of interest real rate plus the expected inflation rate.)

You can obtain a better grasp of different interest rates by examining some of the features that different rates have in common and using those features which distinguish them from each other. A starting point is to recognise that interest rates are expressed in percentage and basis points. In addition, there are 100 basis points in each percentage point of interest.

[3] **Source**: Bank of Canada

Now let us be more specific about the way the bond market works in the economy. We have assumed that bond markets determine the interest rate on the bonds. More precisely, bond markets typically determine not the interest rate but rather the price of bonds. The interest rate can then be inferred from the price. Let us look at the relation between interest rates and price more closely.

Let the bonds be one-year bonds that promise a payment of $100 annually. Such bonds, when issued by most governments and promising payment in a year or less, are called *Treasury bills* or simply T-bills. Thus, you can think of the bonds in your economy as one-year T-bills. Let their price today be RMP_B, where B stands for "bond". If you buy the bond today and hold it for a year, the rate of return on holding the bond for a year is equal to ($100 - $\$P_B$)/$\$P_B$ (what you get for the bond at the end of the year minus what you pay for the bond today, divided by the price you paid for the bond today). Thus, the interest rate on the bond is defined by:

$$i = \frac{\$100 - \$P_B}{\$P_B} \qquad (2)$$

For example, if $\$P_B$ is equal to $95, the interest rate will be equal to $5/$95 or 5.3 per cent. If $\$P_B$ is $90, the interest rate will be 11.1 per cent. Therefore, the higher the price of the bond, the lower the interest rate.

Equivalently, if we are given the interest rate, we can infer the price of the bond. Reorganising the formula above, the price of a one-year bond is given by:

$$\$P_B = \frac{\$100}{(1 + i)} \qquad (3)$$

The price of the bond is equal to the final payment divided by 1 plus the interest rate. Thus, if the interest rate is positive, the price of the bond is less than the final payment. Moreover, the higher the interest rate, the lower the price today. When newspapers write that "bond markets went up today", they mean that the prices of bonds went up and therefore interest rates went down.

Typically, bonds with maturities of more than one year offer a fixed rate of return known as a *coupon rate*. For example, suppose you purchased a $1,000 bond with an interest rate (coupon rate) specified as 6 per cent per annum. In this case, you are guaranteed an annual interest payment of $60 until the bond matures, at which time you, or whoever else holds the bond, will recover your principal, $1,000 as well.

Study skills

Suppose a bond pays $1,000 in one year. If the price of the bond is $750 today, we know that the interest rate on this bond is:

A. 7.5 per cent

B. 15 per cent

C. 25 per cent

D. 33 per cent

Solution:

D. ($1,000 – $750)/ $750 = .33 or 33%

Financial systems

Now that you can define the functions money serves, you are in a position to consider the system in which it operates as well as the supply of money. The most important elements of financial systems are *financial intermediaries*. Financial intermediaries are primarily deposit takers, bodies that accept funds provided by savers and lend these funds to borrowers.

For the deposit-taker, the deposits it accepts and owes back to savers are its liabilities and the funds it lends to borrowers, and which borrowers owe the deposit-taker, are its assets. These institutions make a profit by paying lower interest rates on deposits than they charge on loans.

Financial intermediaries

Deposit-takers fall into two categories: *commercial banks* – which in some countries are known as chartered banks – and *near banks*. The original mandates of the two categories were discrete as the following paragraphs suggest. In reality, the dividing lines are more blurred. Recent changes in most countries' banking laws mean that commercial banks now conduct operations in a much wider range of services including insurance and securities. Other recent legislative changes have allowed mergers among near banks so that most traditional barriers between deposit-taking, trust, insurance and investment banking (securities) operations have vanished.

Commercial banks

Banks are the backbone of the financial system. They receive funds from people and firms and use these funds to make loans and to buy bonds. Unlike other deposit-takers, these institutions are typically allowed to sell a wide range of financial services. What makes them different from other financial intermediaries is that they receive those funds by offering chequable deposits that allow depositors to write cheques or get cash on demand, up to an amount equal to the account balance. For this reason, these accounts are also called *demand deposits*.

The balance sheet of banks is given in **Figure 4.1**. On the asset side are cash reserves, loans, and bonds, whereas on the liability side are deposits. While deposits are liabilities to banks, they are assets to depositors.

Banks

Assets:	*Liabilities:*
Cash reserves Loans and bonds	Deposits

Figure 4.1

Near banks

In contrast to commercial banks, near banks have more specialised financial services. The most important are trust companies, mortgage and loan companies, credit unions and other forms of government as well as private savings and loan associations.

Trust companies, for example, administer various types of accounts, including estates and trust funds. Nowadays, they also compete with commercial banks by taking deposits and granting loans, mainly to households.

In addition to deposit-takers, there are other types of financial specialty institutions such as insurance companies and investment dealers. Insurance companies offer policies to their clients and use the funds to buy various types of income-producing financial assets. Investment dealers buy and sell financial securities such as stocks and bonds for their customers.

Cash reserves

Why do financial institutions hold reserves? On any given day, some depositors withdraw cash from their chequing accounts while others deposit cash into their accounts. Since there is no reason for the inflows and outflows of cash to be equal, a bank must keep some cash on hand. In the same way, on any given day, what a bank owes to other banks (as a result of cheques written by people with accounts at this bank) may be greater or smaller than what other banks owe to this bank (as a result of cheques received and deposited by people with accounts at the bank). Thus, for both reasons, banks want to keep some reserves even if they are not required to do so.

Under the laws of some countries, banks are required to hold reserves as a percentage of their deposits. These reserves are known as *required reserves* (or *legal reserves*): the *minimum amount* of reserves that banks by regulations must hold against deposits. In these situations, the central banks tend to alter required reserves to influence the money supply. A more detailed description of how changes in these reserves can affect the money supply will follow below.

Fractional reserve banking system

The foregoing description of cash reserves gives you the context from which to infer what a fractional reserve banking system might be. In this system, banks do not hold the whole of their total deposits as reserves but rather a fraction called the *reserve requirement* (*r.r.*) ratio. This ratio is determined by a combination of government regulation and the central bank policy. Recently, some countries around the world such as Canada, have repealed the system of reserve requirements. Despite this, banks will hold reserves as assurance that they will not run short of cash.

For our purpose here, take the reserve ratio as given and examine what fractional-reserve banking means for the money supply. Let us suppose that all banks within the nation have and maintain a reserve ratio of 10 per cent. This means that they keep 10 per cent of their deposits in reserve and lend out the rest. Now let us consolidate assets and liabilities of all banks within the nation to make the following T-account, **Figure 4.2**.

All banks
(in billions of dollars)

Assets:		*Liabilities:*	
Cash Reserves:	$10	Deposits:	$100
Loans and Bonds:	$90		

Figure 4.2 Consolidated banks' T-Account

On the left-hand side of the T-account are the bank's assets of $100 billion, consisting of $10 billion cash reserves held partly in their vault and partly in the form of deposits with the central bank and $90 billion in bonds or in the form of loans. On the right-hand side of the T-account are banks' liabilities of $100 billion, made of deposits they owe to their depositors. The assets and liabilities balance exactly.

Notice that in this situation, the reserve/deposit ratio is 10/100 = 0.10 (or 10 per cent), which is the fraction of their deposits we have assumed banks hold in the form of cash on average. More importantly, the figure shows that for every dollar of cash reserves on hand, banks have been able to collectively create $10 of deposits, or for their $10 billion of reserves, $100 billion of deposits. Therefore, banks seem to have been able to create deposits and hence, create money supply.

Recall that the money supply equals currency plus deposits. Thus, when banks hold only a fraction of deposits in reserve, banks *create* money. They do this by using the amount not held in the form of reserves. Since only 10 per cent is, the remaining 90 per cent is lent out or invested in bonds. When banks lend out money, they open new accounts for the borrowers from which they can withdraw. In this case, they have

collectively created 10 times more money than was initially available to them.

The banking (money) multiplier

When banks hold $100 billion in deposits for $10 billion reserves, the reserve ratio is 10 per cent (10/100). The *banking multiplier* just turns this idea around. If the banking system as a whole holds a total of $10 billion in reserves, it can have only $100 billion in deposits. In other words, if *rr* is the ratio of reserves to deposits for all banks, 10 per cent in this case, then the ratio of deposits to reserves in the banking system (that is, the banking multiplier) must be 1/*rr*, 10.

Study skills

Suppose the sum of all deposits in local banks is $400 billion and the combined amount of cash reserves on hand in this economy is $20 billion.

1. The reserve ratio in this case is:
   A. 20 per cent
   B. 10 per cent
   C. 5 per cent
   D. Cannot be calculated.

2. The banking multiplier is
   A. 20
   B. 10
   C. 5
   D. Indeterminate

3. The total amount of money that banks in this economy can collectively lend out is
   A. $400
   B. $380
   C. $20
   D. $5

Solutions:

1. C. You calculate the reserve ratio by dividing total reserves ($20) by total deposits ($400), 20/400 = 0.5 or 5%.
2. A. The multiplier equals 1/rr = 1/.05 = 20.
3. B. The T-account apparatus reveals that the sum of assets must be equal to liabilities. Since liabilities total $400 billion (deposits), total assets must be $400 billion, too. With reserves pinned at $20 billion, the residual (loans) must be $380 ($400 -$20).

Central bank

Four responsibilities are often mentioned for central banks. These are:

1. *Issue currency*. This refers to supply notes and coins into the economy according to certain guidelines and objectives.
2. *Act as the banker to commercial banks*. In this capacity, the central bank holds deposits for commercial banks as commercial banks do for the public. These deposits at the central bank enable commercial banks to make payments to one another. More importantly, central banks act as the lender of last resort by extending short-term loans to banks that may be in a credit crunch.
3. *Act as the banker to the government*. The central bank, in this capacity, manages the government bank account, which is held with the central bank, and handles its debt.
4. *Control money stock*, which is the most important task of the central bank. The decision by the central bank concerning the money supply is referred to as monetary policy.

At present, currencies issued by central banks are referred to as *fiat* money – money that has no intrinsic value. Central banks no longer link their respective currency to precious metals such as gold, so currencies have no intrinsic value. A fiat is an order or a decree.

The balance sheet of the central bank in this economy is shown in **Figure 4.3**.

Central Bank		
Assets:	*Liabilities:*	
Government bonds, Loans to banks, International reserves	Currency & banks deposits, Government deposits	H = CU +R

Figure 4.3 Central bank's T-Account

As shown in **Figure 4.3**, the central bank's assets are primarily government bonds that it holds in its portfolio, its loans (advances) mostly to banks, and international (official) reserves. Its liabilities are primarily currency and banks' deposits. The sum of currency which is held partly by the public and partly by banks in the form of cash – in the vault as well as banks' deposits – is known as the *central bank money*. The last item on the liability side is the government deposits.

The central bank controls central bank money, which is more commonly known as *monetary base* or *high-powered money*:

$$H = CU + R \qquad (4)$$

where *CU* stands for currency, *R* for banks' reserves, and *H* for high-powered money.

A quick comparison between equation (4) and the money supply equation — equation (1):

$M_s = CU + D$ — reveals that:

1. The size of money supply (M_s) is a multiple of the high-powered money (*H*) because (though their first term on the right-hand side, *CU*, is the same) their second term is different:

   D versus R,

   where D is a multiple of the R (D/R = 1/*rr*).

2. The central bank controls only part of the money supply directly. That is currency (CU). Its controls of the rest of money supply – deposits (D) – are indirect. Commercial banks, not the central banks, decide how much shall be made in loans and therefore how much to create in deposits. However, the central bank can influence banks' decisions in this regard by changing banks' level of cash reserves or by altering the interest rate, which influences bank's incentive to make more or less. Banks make more and keep less idle cash when the interest rate rises and make fewer or smaller loans when the interest rate falls. In the latter case, banks are willing to sacrifice the (small) return – low opportunity costs – in favour of larger liquidity (idle cash).

Monetary policy

You have seen already that a change in the quantity of money affects aggregate demand and the economy. The central bank has the power to increase or decrease the volume of the currency in the economy and therefore, is responsible for monetary policy. This makes the central bank an important institution able to exert profound influence on the economy.

Tools of monetary policy

Open-market operations

Think of your economy as having a market where people buy and sell bonds in exchange for money so that those who want to increase the proportion of bonds in their portfolio buy bonds and those who want to decrease it sell bonds. In an equilibrium, the interest rate is such that the demand for bonds is equal to the supply of bonds or equivalently, the supply of money is equal to the demand for money, and the equilibrium condition, as shown in **Figure 4.4** holds.

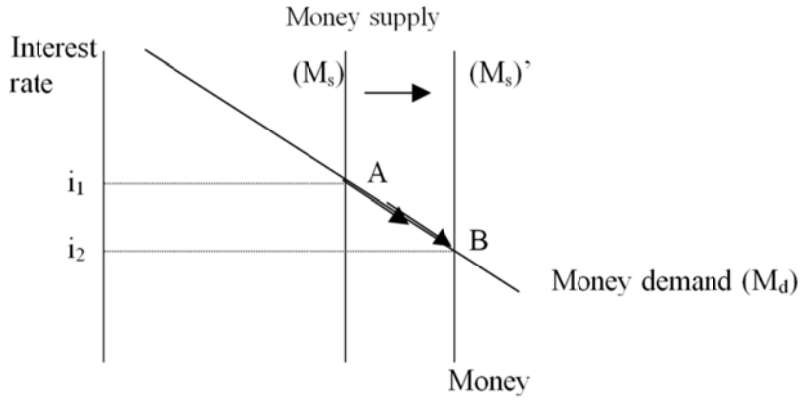


Figure 4.4

Now, think of the central bank as changing the stock of money in the economy by buying and selling bonds in the bond market. If it wants to increase the stock of money, the central bank buys bonds and pays for them by creating money. If it wants to decrease the stock of money, the central bank sells bonds and removes from circulation the money it receives in exchange for the bonds. Such operations are called *open market operations*, because they take place in the "open market" for bonds.

Consider now the effects of an open purchase of government bonds – an open market operation in which the central bank increases the supply of money (an *expansionary monetary policy*). In such a transaction, the central bank buys bonds in the bond market and pays for them by creating money. As it buys bonds, the demand for bonds goes up and thus the price of bonds goes up. Equivalently, the interest rate on bonds goes down. In terms of **Figure 4.4**, the injection of money into the economy thereby, causes a rightward shift in the money supply curve to Ms' and the interest rate drops to i_2.

When, instead, the central bank wants to decrease the supply of money, it does an *open market sale of government bonds* (*contractionary monetary policy*). This leads to a decrease in their price, and thus to an increase in the interest rate. In this case, M_s would shift to the left and the interest rate would rise along the M_d curve.

From the double bookkeeping perspective, an open market operation leads to equal changes in assets and liabilities. Suppose the central bank buys $1 million worth of bonds from commercial banks. This causes the amount of bonds the central bank holds to rise by $1 million that it pays for by increasing banks' cash reserves by $1 million. **Figure 4.5** illustrates this situation.

Central Bank		Banks	
Government bonds + $1m	Bank's reserves (R) + $1m	Government bonds - $1m Reserves (R) +$1m	

Figure 4.5

When the central bank purchases bonds, it pays for it by raising banks' cash reserves by equal magnitude. Recall that cash reserves are assets to banks while liabilities to the central bank. Banks facing a net increase of cash reserves are now in a position to expand their lending operation. In light of the banking multiplier discussion earlier, we know that for every available dollar of reserves banks can potentially extend several times in loans. In this case, if *rr* is assumed to be 0.10, banks can collectively lend $10 million and hence increase the money supply by that amount.

Reserve requirements

Reserve requirements influence how much deposits the banking system can create with each ringgit of reserves. An increase in reserve requirements means that banks must hold more reserves and, therefore, can lend out less of each dollar that is deposited. As a result, the reserve ratio goes up, the banking multiplier goes down, and the money supply decreases. Conversely, a decrease in reserve requirements lowers the reserve ratio, thereby increasing the banking multiplier and the money supply.

The central bank rate

Central banks typically act as bankers to the commercial banks. As you saw in the previous section, these banks hold deposits at the central banks which are part of their reserves. In situations where banks face an overall cash shortfall that they cannot cover by borrowing from other banks, or in cases where an individual bank faces a negative balance vis-à-vis other banks, they resort to borrowing from the central bank. The rate of interest that central banks charge commercial banks for these loans is called the *discount rate* in some countries. In Canada, it is known as the bank rate.

The central bank can alter the money supply by changing the discount rate. An increase in the discount rate by the central bank *reduces the quantity of reserves* in the banking system by discouraging banks from borrowing reserves from the central bank, which in turn *reduces the money supply*. Conversely, a lower discount rate encourages borrowing from the central bank increasing the quantity of cash reserves and hence increasing the money supply.

Study skills

Suppose you are given the following information about your economy. Public deposits with commercial banks total $100 billion. Banks' reserves are $5 billion, two-thirds of which is in deposits with the central bank. There are $10 billion notes and coins outside bank (in the hands of the public).

Calculate:

A. The high-powered money.

B. The money supply.

C. Banks' reserve ratio.

Solutions:

A. High-powered money (H) = Currency in hands of public (CU) + banks' reserves(R), or H= $10 + $5 = $15.

B. Ms = CU + D = $10 + $100 = $110.

C. R/D = 5/100 = 0.05 = 5%.

Transmission mechanism of monetary policy

This study section has already discussed at some length how changes in money supply and interest rate affect the economy. Figure 4.6 uses the aggregate demand-aggregate supply model to illustrate this effect diagrammatically.

Figure 4.6

Assume the central bank conducts an open-market operation in which it buys government bonds from the public (including the banks). This increases the money supply and lowers the interest rate. This is shown by a rightward shift in the M_s curve to $M_{s'}$ and an adjustment in the interest rate to i_2, panel (a). The lower interest rate stimulates investment as consumers, enjoying a lower cost of borrowing, buy more and larger houses and firms spend more on new machinery and equipment, and so on. As a result, the quantity of output demanded, at the given price level, increases and the AD curve shifts to the right to AD_2, panel (b).

The short-run impact of this expansionary monetary policy is an increase in the level of output, represented by Y_2, and a surge in price, P_2. Of course, this adjustment entails subsequent changes in price and output beyond the short run. At the next stage, $SRAS_1$ begins to shift to the left, reflecting an upward pressure on nominal wages. In the long run, the economy reverts to LRAS, settling at Point C', where AD crosses LRAS.

Figure 4.7 illustrates a policy appropriate to the above analysis but in a situation where the economy starts from a recessionary gap instead, $(Y_1 - Y_n) < 0$. An expansionary monetary policy could be designed to shift the aggregate demand curve by exactly the right amount to cross the SRAS along LRAS curve, point B. This would be the final (long-run) equilibrium situation where the economy will settle in.

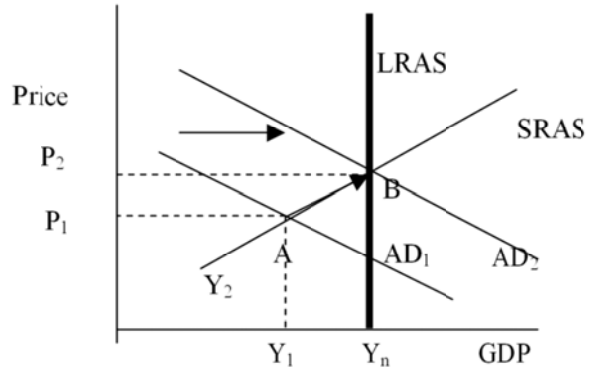


Figure 4.7

How much extra aggregate demand is needed?

To be effective, the expansionary (counter-cyclical) monetary policy, shown in **Figure 4.7** requires accurate information on the current level of GDP (Y_1) and on the gap between it and potential GDP, $(Y_1 - Y_n)$. Identifying the size of the gap, however, involves painstaking research and good judgement. It can be a hazardous exercise. A thorough and accurate job requires large econometric models of the economy comprising many equations to estimate these curves and their parameters first.

Objectives of monetary policy

Most central banks around world have shifted their focus to *price stability* as their main objective. Price stability is defined as the sustained absence of both inflation (prices rising too fast) and deflation (falling prices).

One would hope that the decline in *inflation* has been associated with a demonstrable improvement in economic efficiency and social stability. Many experts believe that it has, and for good reason. However, causality is never simple in economics. Low inflation does not guarantee good economic performance, nor does every high-inflation country grow slowly. In the latter instance, growth occurs despite inflation not because of it. Price stability certainly assists economic growth, while departures

from price stability never actively help to improve economic performance.

Industrial countries experienced relative price stability in the 1990s while extremely high rates of inflation prevailed in parts of Latin America, Turkey and the emerging market economies of the former Soviet bloc. High inflation has damaged these economies and has distorted the business environment.

Many economies have introduced successful counter-inflationary programmes during the past decade. Argentina's inflation reached nearly 5,000 per cent in 1989 but, following its stabilisation programme, it fell to 3 per cent. Bolivia, Chile and Israel provide other examples of successful stabilisation.

The monetary authorities in the euro area, New Zealand, Canada and the United Kingdom are formally committed to maintaining stable prices. Most other countries have a strong public commitment to keeping inflation low although less formal targets are set. These countries have found price stability an essential element in a healthy business environment.

Deflation, too, can be a major problem as Japan's experience in the past decade demonstrates.

It is sufficient to say that price stability not only means avoiding the costs of inflation but also the costs of deflation, which in fact could be far greater. A stable domestic price system helps to ensure that international exchange is conducted on the basis of a correct knowledge of prices and alternatives.

Ingredients of a successful price stability programme

The control of inflation involves a broad spectrum of economic policies. It is more than a mere economic slogan. It requires political commitment. An informed public opinion is also important. For example, Germany's successful anti-inflation strategy has been supported by the popular aversion to inflation. Furthermore, central banks should be largely *independent* of political control. The evidence indicates that independence rather than management by politicians is the optimal strategy for low inflation. Political control may lead to policies such as a pre-election cut in interest rates (to help the electoral prospects of the incumbent party), which results in higher inflation at a later stage. Many countries have acknowledged this danger and are responding by measures to increase the autonomy of the monetary authorities.

Central banks also need a clear statement of their policy objective. Ideally, this objective should be to maintain price stability. Central banks, as the guardians of monetary policy, may be asked to carry out unpopular tasks. In Canada, for instance, the Bank of Canada has effectively communicated its policy objectives to the public by pre-announcing its course of action. Furthermore, it has set a clear and explicit target range for inflation, 1 per cent to 3 per cent, and has made every effort to keep

the rate of inflation at the mid-point of this inflation target range. Another example is the European Central Bank (ECB). Twelve European counties, known as Euro 12, are guided by the monetary policy of the ECB with its unqualified objective of price stability and elaborate guarantee of independence.

Budget deficits, debts and fiscal policy

Budget deficits, excessive government debt, and high taxes have recently become an almost universal focus of concern. Thirty years ago, governments worried much less about these matters. Management of public finances, in the sense of balancing the books and keeping debt levels under control, was considered a rather pedestrian exercise. Fiscal policy was judged primarily in terms of its success in dampening economic fluctuations and maintaining full employment. In recent times, this counter-cyclical function of public finances has been downplayed. Keynesian economics, from which the era of fiscal activism drew its intellectual sustenance, has declined in prestige. Fiscal *balance* has replaced fiscal *activism* as the conventional target of fiscal policy.

In general, governments can affect spending and output levels in an economy through two sets of instruments. The first, discussed above, is clearly monetary policy. However, governments can have an extensive impact on the economy through taxation and government purchases. Because a government's annual budget sets out what the government will tax and spend, the budget becomes an instrument of stabilisation policy. Such a policy is called *fiscal* policy – fiscal meaning budgetary. The 12-month period to which the budget applies is called the *fiscal year*.

Governments apply fiscal policy during any part of the business cycle. During a recession, government action is geared towards increasing spending and output in the economy – *expansionary fiscal policy*. Such a policy involves increasing government purchases, decreasing taxes or both. In contrast, during an inflationary boom, the concentration is geared towards restraining spending and output – *contractionary fiscal policy*, which involves decreasing government spending and increasing taxes.

Remember the goods market equilibrium market condition from Module 3, $Y = C + I + G$ in a closed economy. An expansionary fiscal policy increases aggregate expenditures and hence output either (a) by increasing G, which increases aggregate expenditure (right- hand side) directly, or (b) by decreasing taxes, which also increases aggregate expenditures, but indirectly via C or perhaps I, or (c) both. Contractionary fiscal policy works in the opposite direction.

Discretionary versus automatic policy

As we have seen, fiscal policy involves adjusting government purchases or taxes. These actions are intentional; laws must be passed and budgets brought down. Because it is up to a government's discretion to take these actions, fiscal policy is known as *discretionary* policy. In contrast, some

stabilising forces are *automatic*. That is, they do not involve the direct involvement of government decision-makers.

For example, *transfer payment* programmes to individuals by the government such as unemployment benefits and welfare payments as well as established taxes such *as progressive income taxes*, act as automatic stabilisers in business cycles. In a period of contraction, net tax revenues (taxes minus transfers and subsidies) decrease whereas during a period of expansion, net tax revenues increase. As a result, spending and aggregate demand are stimulated in a downturn and suppressed in an upswing, thereby helping to smooth out the business cycle.

The multiplier effect

The multiplier effect is the magnified impact of any spending change on aggregate demand. It is the change in spending multiplied by a certain value to give the resulting change in aggregate demand.

Suppose actual GDP was $1,050 billion and potential GDP $1,100 billion. At first sight, it might appear that a $50 billion injection of government spending would close the gap. But this is incorrect. According to the *theory of the multiplier*, aggregate demand would increase by a multiple of the initial injection. To see this, suppose the government, in view of this gap, were to spend an extra $50 billion on roads. The initial injection of $50 billion increases the economy's output by $50 billion and the income of employees and suppliers of materials by $50 billion. Suppose they, in turn, save 20 per cent ($10 billion) of their income and spend (consume) 80 per cent of their income ($40 billion) on cars or new houses. This gives a boost to the car industry and the construction industry, and to their employees and shareholders. The output of the economy has expanded by another $40 billion and the income in construction and car sector has also increased by $40 billion. Next, suppose the employees and shareholder of these sectors spend 80 per cent of their income, (0.80 × $40 billion = $32 billion) and save 20$ ($8 billion). This $32 billion now constitutes income for somebody else who is assumed to spend 80 per cent and save 20 per cent and so forth.

We see that the initial spending impulse of $50 billion has generated further spending of $40 billion and $32 billion, for the total of $122 billion after three steps (rounds), as well as $18 billion saving ($10 billion + $8 billion). But the process has by no means ended.

This description of the multiplier presents an intuitive and much simplified version of what in reality is a complex process. For one thing, account should be taken of "*leakages*" from income into taxes and savings as well as, in an open economy, into imports. Any given purchase made by the government has an initial effect, a secondary effect, and so on.

As the example illustrates, the inclination to spend and the inclination to save or otherwise withdraw funds from the economy both determine the *multiplier effect*. These factors are summarised by the concepts of

marginal propensity to consume and marginal propensity to save or more generally marginal propensity to withdraw.

As discussed earlier, *Marginal Propensity to Consume* (*MPC*) is the effect on domestic consumption of a change in income. In effect, MPC answers the question: "If income increases this amount, how much extra will be spent on domestic goods and services?" MPC is defined as the change in consumption on domestic products as a proportion of the change in income.

Now that the multiplier effect has been seen in action, we will give it a numerical value. The *spending multiplier* is the value by which the initial spending change is multiplied by to give the total change in output –that is, the shift in the aggregate demand curve. This multiplier effect continues even after this first round and definitely does not stop at the third round. Once all these effects – a process that continues until the last-round effect is negligible – are added together, the total impact on the quantity of goods and services demanded can be much larger than the initial impulse from higher government spending.

Figure 4.8 illustrates the multiplier effect. The increase in government spending of $50 billion initially shifts the aggregate-demand curve to the right from AD_1 to AD_2 by exactly $50 billion. But when consumers respond by increasing their spending, the aggregate-demand curve shifts further to AD_3.

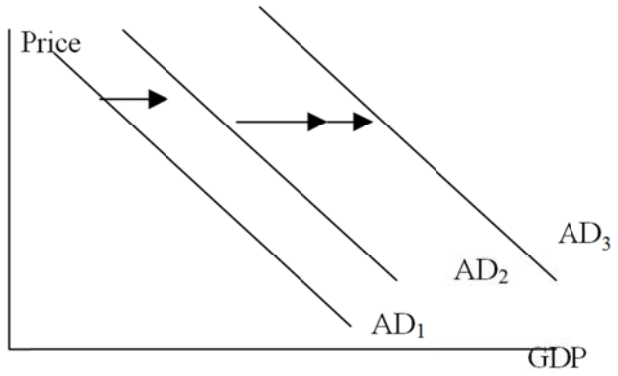


Figure 4.8

The additional shifts in the aggregate demand curve i.e., from AD_2 to AD_3 are the result of the subsequent increases in consumer spending. Therefore:

Total increase in spending = Initial increase in G + Sum of all subsequent increases in C.

Or,

Total change in output = Initial change in G × Spending multiplier

For a given initial increase in *G*, the bigger the second term on the right, the bigger the overall effect on output (the left-hand side) and the greater the multiplier. Since the size of the change in *C* (second term on the right) is determined by MPC, we can conclude that the bigger MPC, the greater the impact of fiscal policy on the economy. Put differently, the smaller the marginal propensity to save (withdrawal), the larger the multiplier.

Mathematics helps determine the magnitude of the *spending* multiplier in this case, which incorporates the initial as well as the subsequent effects on GDP:

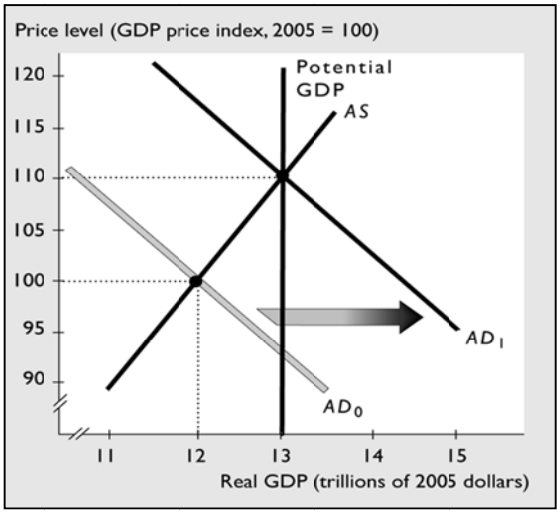
Multiplier = change in GDP/ change in G = 1/(1-MPC).

The importance and relevance of this concept can be appreciated by recalling the hypothetical scenario in which your economy faced a recessionary gap of $50 billion.

Based on our understanding of the concept of the multiplier, we can now conclude that in order to close this gap of $50 billion, the government needs to inject a mere $10 billion instead of $50 billion. The reason for scaling down the amount so far is that the magnitude of the multiplier (1/(1-0.8)) is 5 and, therefore, an injection of $10 billion brings about an initial increase of output by $10 billion plus the subsequent increases in consumption spending of $40 billion for the overall effect of $50 billion.

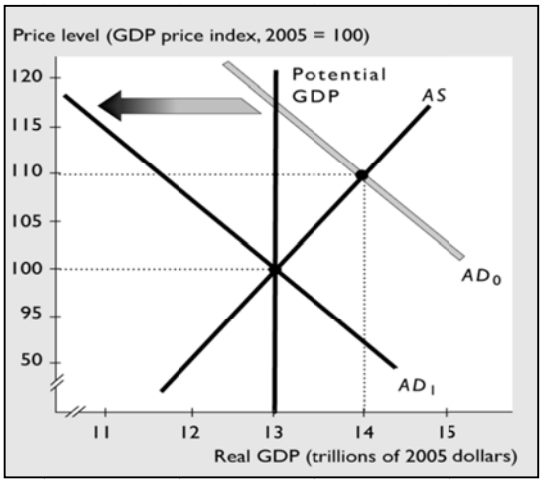
A successful expansionary fiscal policy

An expansionary fiscal policy or fiscal stimulus is designed to increase aggregate demand by increasing government expenditure or transfer payments, or decreasing in taxes (or combination of all three actions) to eliminate a recessionary gap. As shown in the figure, the initial equilibrium is at real GDP of $12 trillion and a price level of 100. Since potential GDP ($13 trillion) is more than real GDP at this point, there is a recessionary gap. In dealing with this economic problem, the government or authority can use expansionary fiscal policy. The initial increase in aggregate demand from the cut in taxes or hike in transfer payments or government expenditure is reinforced by the multiplier effect. The aggregate demand curve (AD) shifts rightward from AD_0 to AD_1. Real GDP rises so it equals potential GDP ($13 trillion) and the price level increases, to 110, as indicated in the figure.



A successful contractionary fiscal policy

Contractionary fiscal policy is a fiscal policy designed to decrease aggregate demand by decreasing transfer payments or government expenditure, or an increase in taxes (or a combination of all three actions) to eliminate an inflationary gap. As shown in the figure, the initial equilibrium is at real GDP of $14 trillion and a price level of 110. Since real GDP exceeds potential GDP ($13 trillion), there is a recessionary gap. To solve the inflationary effect, government can use contractionary fiscal policy. The initial decrease in aggregate demand from the cut in government expenditure or transfer payments, or hike in taxes is reinforced by the multiplier effect. The aggregate demand (AD) curve moves leftward from AD_0 to AD_1. Real GDP decreases so it equals potential GDP ($13 trillion) and the price level falls to 100.



Effect of a tax cut

The multiplier effect can be applied to the other tools that governments use: taxes. Recall that tax cuts can be used to expand the economy. *Lower*

taxes leave households and businesses with more funds to spend and invest. In this case, the initial spending stimulus of the tax cut is multiplied by the spending multiplier, or the reciprocal of MPS, which is also equal to (1/(1-MPC). The result is an increase in total output, shown as a shift in the aggregate demand curve.

In contrast to government purchases, a tax adjustment has a smaller initial effect on spending. In our previous example of the government spending multiplier, a $10 billion increase in government purchases caused GDP to rise by ($10 × 5 = $50) to close the recessionary gap. The important point is that the *initial* impact of a change in *G*, say $10 billion, on aggregate expenditure (*C* + *I* + *G*), is equal to $10 billion. In contrast, the initial effect of a tax cut of equal magnitude ($10 billion) is less than $10 billion. The reason is that changes in taxes influence spending, *C*, by first changing consumers' disposable income by $10 billion. However, since MPC is always less than one – 0.80 in this example – consumption spending and hence aggregate expenditures only rise by (0.80 × $10 = $8), which is clearly less than $10.

The effect of a tax change can be summarised in mathematical terms similar to those which show the effect of a change in government spending. The initial change in spending on domestic items that results from a change in taxes (T) is found by multiplying the marginal propensity to consume by the size of the tax change, and this product is then multiplied by the spending multiplier (1 /(1-MPC)) to derive the overall shift in the aggregate demand curve. And since this spending change is in the opposite direction to the tax change itself, the expression is preceded by a negative sign.

Total change in output = Initial change in spending × Spending multiplier

$$-(\text{MPC} \times \text{change in T}) \times (1/(1-\text{MPC}))$$

The multiplier is an important concept in macroeconomics because it shows how the economy can amplify the impact of changes in spending. A small initial change in consumption, investment, government purchases or net exports end up having a large effect on aggregate demand and therefore, on production of goods and services. It is because of the amplified impacts that policy-makers must pay close attention to events such as the possibility of recession among our trading partners and the possibility of a stock-market boom or crash.

Study skills

1. When an economy faces an inflationary gap, a suitable fiscal policy is to:
   A. increase government expenditure.
   B. decrease taxes.
   C. decrease government expenditure.
   D. decrease the quantity of money.

2. Which of the following is NOT an example of a fiscal stimulus?

A. increase in government expenditure on goods and services

B. increase in transfer payments

C. decrease in taxes

D. increase in taxes

3. If the economy is in equilibrium with real GDP less than potential GDP, there is _____ gap and a fiscal policy that _____ is suitable.

A. a recessionary; increases potential GDP

B. a recessionary; increases aggregate demand

C. an inflationary; decreases aggregate demand

D. an inflationary; increases aggregate demand

Solutions:

Discuss your answers with your tutor.

Study skills

1. Suppose $C = 200 + 0.75$ YD. The multiplier in this economy is equal to:

A. 0.75

B. 0.25

C. 4

D. 1.33

2. If, in this same economy, the government spending increases by $10 million, then GDP will increase by

A. $40 million

B. $10 million

C. $7.5 million

D. $2.5 million

3. If, in this economy, taxes fall by $10 million, GDP will increase by

A. $40 million

B. $10 million

C. $7.5 million

D. $30 million

Solutions:

1. C. The multiplier is equal to (1/(1- MPC) = (1/ (1-0.75) = 4.
2. A. The initial change in aggregate spending is $10 million (= change in G) in this case, which is to be multiplied by the spending multiplier, 4. Therefore, GDP rises by $40 million.
3. A. The initial change in aggregate spending is $7.5 million (= change in T x MPC) in this case, which is to be multiplied by the spending multiplier, 4. Therefore, GDP rises by $30 million.

The crowding-out effect on investment

The multiplier effect seems to suggest that when the government spends $10 billion on roads and bridges, the resulting expansion in aggregate demand is necessarily larger than $10 billion – in fact, it was $50 billion in our previous example. However, there is an effect that works against this. While an increase in government purchases stimulates the aggregate demand for goods and services, it also causes the interest rate to rise, in turn reducing investment spending and choking off aggregate demand. The reduction in aggregate demand that results when a fiscal expansion raises the interest rate is called the *crowding-out effect on investment*.

The logic behind this pattern is that, as the spending increases, demand for money rises to enable the spenders to finance their new expenditures. Assuming that this is a pure fiscal policy – no change in the money supply is initiated by the central bank – an excess demand for money develops and the interest rate rises. This rising cost of borrowing, in turn, reduces the demand for residential and business investment in goods. In other words, as the increase in government purchases lifts the demand for goods and services, it may also crowd out investment.

This implies that the previous illustration in **Figure 4.8** lacks the element representing the crowding-out effect and its tendency to lessen the impact of fiscal policy. Two shifts are represented accurately: the AD curve shifts from AD_1 to AD_2 (due to the initial impact of the increase in *G*) and from AD_2 to AD_3 (due to the subsequent changes in *C*). To these, we need to add a third shift in the opposite direction, in order to account for the crowding-out effect.

Figure 4.9 below illustrates the impact of an expansionary fiscal policy in two alternative situations. Panel (a) assumes the economy is in an unemployment (underemployment) situation and in panel (b) in a full-employment situation.

Figure 4.9

An increase in government spending shifts the AD curve from AD_1 to AD_4. This shift is a net of three effects.

1. The initial impact of *G,*
2. the subsequent impacts on C, through the marginal propensity to consume (the multiplier effect), and
3. the crowding-out effect on investment.

The first two effects tend to reinforce each other, pushing the AD curve to the right, whereas the third effect tends to work in the opposite direction, pushing the AD curve to the left.

In panel (a), the economy moves directly from point A to point B, settling at full employment. In panel (b), the economy initially surpasses its potential in the short run, C. In the long run, as nominal wages will rise in response to the inflationary pressure, the SRAS curve will shift shifts up to $SRAS_2$, and the economy will return to long-run equilibrium at point D.

Government budgets

The annual statement of the expenditures and tax revenues of the government makes up the government budget. Therefore, fiscal policy is the use of the federal budget to achieve macroeconomic objectives such as full employment, sustained long-term economic growth, and price level stability.

The government's budget balance is equal to its revenues minus its outlays. That is,

Budget balance = Revenues – Outlays,

where outlays consist of expenditures on goods and services (*G*), transfer payments such as welfare benefits, and debt interest charges, which are payments of interest on previously accumulated debt.

When revenues exceed outlays, the government has a *budget surplus*. If outlays exceed revenues, the government has a budget *deficit*. If revenues equal outlays, the government has a *balanced budget*.

Deficits and debts

The government borrows to finance its deficit. *Government (public) debt* is the total amount of government borrowing. It is the sum of past deficits minus the sum of past surpluses. When the government has a deficit, its debt increases. Evidence indicates that governments of most countries, developed or otherwise, have consistently failed to balance their annual budgets over the last couple of decades. This failure has resulted in ballooning public debts.

Deficit = change in debt,

or

Debt (in 2002) = Debt (in 2001) + Deficit or surplus (in 2002)

To discover the fiscal stance, it is sufficient to say that we need to delve deeper and find out what, if any, extra *discretionary* measures the authorities have taken in response to the situation – that is, deconstruct the budget balance so that the cyclical (recession or boom) component is isolated from the structural component.

The limits of policy activism

We have seen how monetary and fiscal policy can affect the economy's aggregate demand for goods and services. These theoretical insights, however, raise some important policy questions. Should policymakers use these instruments to control aggregate demand and stabilise the economy? If so, when? If not, why not?

The world economy is often subject to the effects of unexpected events – natural disasters, political or economic happenings, or speculative rumours. Events such as these have often been responsible for large changes in output, unemployment and inflation. If monetary and fiscal policy can be used to stabilise the economy, then surely these tools should be used to offset the harmful effects of economic fluctuations. This is the case in favour of using monetary and fiscal policy to stabilise the economy.

Keynes, in his book *General Theory of Employment, Interest and Income* emphasised the key role of aggregate demand in explaining short-run economic fluctuations. Keynes claimed that the government should actively stimulate aggregate demand when aggregate demand appeared insufficient to maintain production at its full-employment level. At the time Keynes wrote the book, the world's major economies were in the midst of the Great Depression. It is no wonder, then, that the Keynesian proposal to use policy instruments to lessen the severity of economic downturns proved popular. Keynes (and his many followers) was a strong advocate of using policy instruments to stabilise the economy.

Nowadays, however, the scope appears to be very circumscribed for using fiscal policy to stimulate economies in the traditional sense of taking action that would widen budget deficits. Having faced mounting deficits and debts, the majority of governments of developed and developing countries have been pressured to introduce strict measures that have led to a conservative approach to fiscal policy. Unfortunately, the progress made under the new conservative approach seems to have lost momentum for now, partly because of the recent economic slowdown but largely due to the fallouts of the September 11 event at the World Trade Center in New York and, more recently, by large-scale accounting frauds by major US corporations, such as Enron and World.com.

Furthermore, the new conservative perspective on policy activism can be explained under *time lags*. The argument against active monetary and

fiscal policy is that these policies affect the economy with a substantial lag.

As we have seen, monetary policy works by changing interest rates, which in turn influence investment spending. But many firms make investment plans far in advance. Thus, most economists believe that it takes at least six months for changes in monetary policy to have much effect on output and employment. Morever, it takes anywhere between 18 and 24 months for monetary policy to have it full impact on the economy. Therefore, critics of stabilisation policy argue that because of this lag, the central bank should avoid *fine-tuning* the economy.

Fiscal policy suffers from long lags as well. However, there are major differences in the structure of the lags in fiscal versus monetary policy:

1. Monetary and fiscal policy have differential impacts on aggregate demand; fiscal policy, at least a change in government spending, affects aggregate demand directly whereas monetary policy has an indirect effect on it. As such, fiscal policy tends to have a shorter *execution* lag.
2. Monetary policy lags are substantially shorter from the perspective of implementation, *implementation lag*. Implementation lags in fiscal policy are largely attributable to the political process. A fiscal policy typically requires an Act of parliament, budgetary preparation and presentation before the policy takes effect, whereas monetary policy does not. Therefore, while the overall length of the policy lags may be similar in both policies, the composition of them is different.

Other arguments against fiscal, not monetary and policy activism can be explained under inefficiencies of a growing public sector and private-sector reactions.

Inflation and Unemployment

Introduction

This section first explores the effects of a trend of rising prices, how the trend is measured, and how it often hurts most those who can afford it least. Such an exploration pulls together the tools you have already acquired, namely the aggregate demand–aggregate supply model. The next step is to consider how the two most-watched economic indicators, inflation and unemployment, are related. You will then examine unemployment in detail in terms of how it is measured, its causes, and its costs, not only for individuals but also for the entire economy.

Inflation

Module1 introduced the concept of a price index and how statistical agencies go about employing this index (or indices) to measure inflation.

A brief recapitulation of the basic concepts sets the stage for a study of inflation.

One key price index is the *Consumer Price Index* (CPI). The CPI is the tool most commonly used to measure overall changes in price in a representative basket of consumer products. Another important price index is the *GDP deflator* – a broader measure of average price. This index is found by dividing the nominal value of GDP by the real GDP. The specific differences between these two have already been discussed and need not be repeated.

Inflation, as introduced in Module 1, is a general increase in the prices of goods and services in the entire economy over time. To measure inflation rate, we calculate the annual percentage change in the price level. For example, the rate of inflation in year 2002 is calculated as follows:

$$\text{Inflation rate}_{(2002)} = \frac{CPI_{2002} - CPI_{2001}}{CPI_{2001}} \times 100$$

This equation shows the connection between the inflation rate and the price level. If the price level is rising, the inflation rate is positive. If the price level rises at a faster rate, the inflation rate will rise. In addition, the higher the new price level is, the lower the value of money and the higher the inflation rate.

Causes of inflation

Demand-pull inflation

An inflation that results from an initial increase in aggregate demand is called *demand-pull inflation*.

Such inflation can arise from any factor that increases aggregate demand, such as:

- An increase in the money supply.
- An increase in government expenditures.
- Increases in exports.
- An increase in consumers' and investors' willingness to buy.

Suppose that last year the price level in the economy was P_1 and the real GDP was at its potential level, Y_n. **Figure 4.10** illustrates this situation. At this long-run equilibrium point, point A, the aggregate demand curve (AD_1) crosses the short-run aggregate supply curve, $SRAS_1$, and the long-run aggregate supply curve, LRAS. Now suppose that this year, the aggregate demand curve increases to AD_2, say due to an increase in consumers' optimism. Assuming no change on the supply side of the economy, and therefore, no changes in SRAS and LRAS, new equilibrium (short-run) levels of the price and real GDP are found where the new aggregate demand curve (AD_2) intersects the short-run aggregate

supply curve at point B, with P_2 and Y_2 at its coordinates. Graphs show a jump in the price level of $(P_2 - P_1)/P_1$ per cent and a surge in the level of income. Furthermore, unemployment falls below the natural rate.

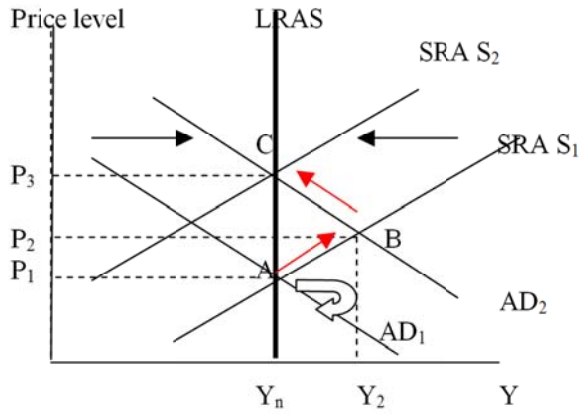


Figure 4.10

Of course, this is not the end of the process of the adjustment. The reason is that GDP cannot remain above its potential value forever. Furthermore, with unemployment below its natural rate, there will be a shortage of labour. In this situation, the money wage rate begins to rise. As it does, short-run aggregate supply decreases and the $SRAS_1$ curve starts to shift leftward. The price level rises further and real GDP begins to decrease. With no further change in aggregate demand – the aggregate demand curve remains at AD – this process ends when the short-run aggregate supply curve has shifted to $SRAS_2$. At this time, the price level has increased to P_3 and real GDP has returned to potential GDP of Y_n, the level from which it started.

Demand-pull inflation can be also sparked off by excessive *growth of money supply* as well as excessive *government budget deficits*. For example, the government might try to stimulate demand in order to achieve a reduction in unemployment. As demand expands, demand in labour markets and goods markets increases, driving up wages and prices. Also, the deficit could affect the liquidity base of the economy, in effect increasing the money supply, temporarily lowering interest rates, and giving an additional boost to the economy.

Cost-push inflation

An inflation that results from an initial increase in costs is called *cost-push inflation*. The two main sources of increases in costs are an increase in the money wage rate and an increase in the price of raw materials.

At a given price level, the higher the cost of production, the smaller the amount that firms are willing to produce. Therefore, if the money wage rate rises or if the price of raw materials (for example, oil) rises, firms decrease their supply of goods and services. Aggregate supply decreases, and the short-run aggregate supply curve shifts leftward.

Let us trace the effects of such a decrease in short-run aggregate supply on the price level and output. Again, assume a similar set-up as in the previous figure seen in **Figure 4.11**.

Starting from last year's long-run equilibrium, point A, let us assume that this year the OPEC nations increase the price of oil by cutting production. The short-run aggregate supply curve shifts to the left, $SRAS_2$. At point B, the price level rises and output of the economy falls, a combination we referred to earlier as *stagflation*.

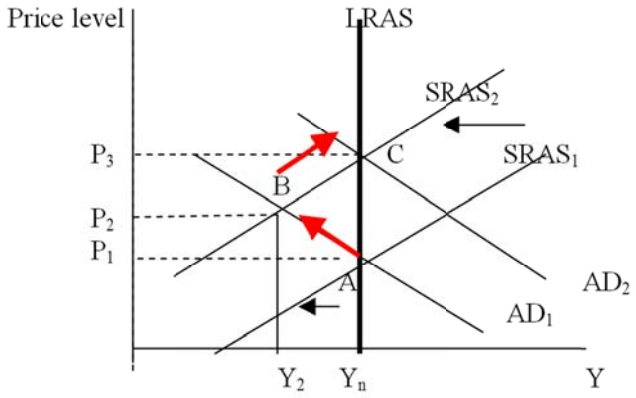


Figure 4.11

Money supply and inflation

If each of us woke up today with twice as much money as yesterday, two things could happen:

1. we could spend some of the extra money on goods and services to celebrate our good fortune, which would cause the price level to rise, or

2. we might invest part of the money in government bonds or similar financial assets. In this case also, the resultant surge in asset prices would confer upon the public a positive wealth effect that would in turn boost demand for goods and services. Hence, prices would be driven up – assuming fixed production.

Ultimately, if the level of output remained unchanged despite this surge in demand, prices would be rising to the same extent as the nominal supply (stock) of money –doubled – and the initial equilibrium would be restored with prices and the nominal income being twice as much as they were originally. In this situation, people are willing to hold all the 100 per cent increased supply of money because the real purchasing power of the public has remained unchanged despite the doubling of the money supply. Now, one needs to hold twice as much money as before, since the price of everything has doubled. This explains why inflation cannot continue without a sustained increase in the money stock and why continued excessive increases in the money stock are invariably followed by inflation.

In Module 3, the chain of causation can be sketched within the aggregate demand and aggregate supply framework. This framework shows that the long-term impact of the increase in the money supply may be different from its short-run impact. In the short run, a rise in the money stock causes higher prices, but it also leads to more output. The output effect occurs because of short-term rigidities, reflecting employees' inability to respond instantaneously to the decrease in the real wage caused by the increase in the price level. In the longer term, pay levels catch up on inflation and, over time, they will respond more quickly to it. The economy then approximates more and more closely to the vertical aggregate supply.

However, for the current purpose, our focus will be only on the long-term implications. To conduct a long term analysis, we can employ a theory referred to as the *Quantity Theory of Money*. This theory is constructed on the basis of the highly simplified equation:

$$M_s.V = P.Y$$

where M_s = the money supply; V the velocity of circulation of money (the number of times money changes hands); Y = the real GDP; and P = the general price level.

The equation holds that the nominal GDP ($P.Y$) is determined by the quantity of money in circulation and by the velocity of the money. Strictly speaking, the ultimate determinant of money supply is the central bank. The velocity is determined by institutional factors such as habits of payments and receipts – the frequency of receiving the monthly income, which could be weekly, biweekly, monthly – as well as the technological factors such as credit cards, debit cards and automatic bank teller machines. For example, as credit cards are used more widely by individuals, the less cash they need to hold and therefore the greater is the rate of turnover of money – money has to work harder because less of it is being held.

For a given velocity, the equation suggests that as the central bank increases the quantity of money in circulation, the nominal GDP on the right-hand side increases. Assuming that in the long run, the economy is at its full employment level of GDP ($Y = Y_n$) and that full employment of GDP is constant, a direct link is established between changes in Ms and changes in P. An increase in M_s results in an increase in P of equal proportions – one for one. This can also be expressed in percentage terms. Other things being equal (notably, the velocity of circulation and trend growth in income), the higher the growth of money supply, the higher the rate of inflation. Hence, the popular description of inflation is too much money chasing too few goods.

The quantity theory of money is a useful start to a theory of inflation, but it leaves many questions unanswered. It *oversimplifies* the causal interactions between money supply and real output. It places all the emphasis on money supply without explaining the economic and social factors which determine how and why money supply should be allowed

to increase. A fully-fledged theory of inflation would also have to explain the determinants of velocity of circulation and to probe more carefully the justification for assuming that it remains *constant*.

The inflationary process

As already discussed, the quantity theory of money tells us that in order to translate a one-time increase in the general price level into a sustained inflation, money supply has to rise on a sustained basis. The monetary authorities must assent to a continuously rising money supply. A political decision might be taken that the short-run costs of refusing to validate the inflation – costs of civil strife, unemployment and disruption – are greater than the economic costs of inflation. We will proceed with the following explanation.

The oil crisis in 1973 between the oil-importing countries ended with high inflation rates. For example, up to 1973, Britain's inflation rate had only been marginally higher than Germany's. After 1973, Britain's inflation rose to more than double Germany's. The British authorities decided to validate the inflation, whereas in Germany, the authorities made clear their intention not to validate it, and German employers and trade unions responded by keeping tight curbs on prices and nominal incomes.

For Germany, this means, in terms of **Figure 4.11**, a movement from point A to B, with the general price rising moderately from P_1 to P_2. The decision not to increase the money supply dampened inflationary expectations and moderated pay claims. This made it easier to curb inflation. However, to achieve this, there was a price that Germany and Germans had to pay: higher unemployment and lower GDP.

Contrastingly, in Britain, monetary validation caused the price level to rise to P_3 while preventing the unemployment problem that Germany had to face. In terms of **Figure 4.11**, the situation in Britain can be captured by a movement from A to B followed by a movement to C, the latter movement being the result of *monetary validation*.

An important conclusion drawn from this analysis is that inflation and unemployment offer authorities a menu of choices. Inflation, it seems, is the cost to be borne by trying to keep unemployment down; unemployment appears to be the price of keeping inflation down. This implies a *trade-off* between inflation and unemployment that policymakers can take advantage of.

Inflation, unemployment and the Phillips curve

The aggregate demand–aggregate supply model focuses on the price level and real output (GDP). Although one can work out what happens to inflation and unemployment using these two variables (price and GDP), there is great appeal in a more direct approach to studying inflation and unemployment. Such an approach is called the *Phillips Curve*. In essence, the Phillips Curve is based on the aggregate demand–aggregate supply

model but focuses instead on inflation, which is calculated from the price level changes, and unemployment, which can be linked to output via an inverse relationship. However, in the same way that the aggregate demand–aggregate supply model distinguishes between the short- and long-run adjustments, we define the Phillips curve for both frameworks: a short-run curve (SPC) versus a long-run Phillips curve (LPC).

A formal link between output and unemployment can be established through a relationship known as *Okun's law*. Okun's Law provides a precise relationship between the rate of change of output and the unemployment rate. Accordingly, when output of the economy grows beyond a certain normal rate, which tends to vary from country to country, the unemployment rate drops.

Short-run Phillips curve

The Phillips curve shows the combinations of inflation and unemployment that arise in the short run as shifts in the aggregate demand curve move the economy along the short-run aggregate supply curve. As we saw earlier, an increase in aggregate demand gives rise, in the short run, to a larger output and a higher price. Larger output means greater employment and thus a lower unemployment rate while the higher price implies higher inflation. Therefore, inflation and unemployment move in opposite directions in the short run.

In **Figure 4.12**, the link between the aggregate demand–aggregate supply model, panel (a), and the Phillips curve, in panel (b), is highlighted. The equilibrium points A and B in panel (a), correspond to A' and B' in panel (b), and U_1 and U_2 are the unemployment rate counterparts of output level of Y_1 and Y_2. Initially, the price level (price index) is equal to 104 and this, assuming that the previous year's price level coincided with the base year (P =100), puts the inflation rate at 4 per cent per year. This is shown by point A'.

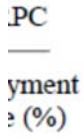


Figure 4.12

Now assume that aggregate demand curve increases (shifting out) to AD_2, pushing up the price to 107 and GDP Y_2. Corresponding to these changes, the unemployment rate is lowered to U_2, while the inflation rate is raised to 7 per cent (using the same base year). This analysis suggests that the upward movement from point A to B, along the SRAS curve, corresponds to a similar movement from point A' to B' along the SRPC curve. Similarly, a downward movement along the SRAS curve that brings about a lower price level and a lower real GDP reflects a downward movement along the SRPC that brings about higher unemployment and lower inflation.

The position of the trade-off line (SRPC) is determined by (a) the expected inflation rate and (b) the natural unemployment rate that are assumed held constant. Similarly, the position of SRAS is determined by the expected price and the natural level of output. If either factor changes, SRPC will shift. An increase in inflation expectations as well as an increase in the natural rate of unemployment causes the SRPC to shift to the right in the same way that an increase in the price expectations and a fall in Y_n would cause a shift in SRAS to the left.

The *long-run Phillips curve* shows the relationship between inflation and unemployment when the actual inflation rate equals the expected inflation rate. The long-run Phillips curve, LRPC, is vertical at *the natural unemployment rate*, U_n, as is the long-run aggregated supply curve vertical at Y_n, as seen in **Figure 4.13**.

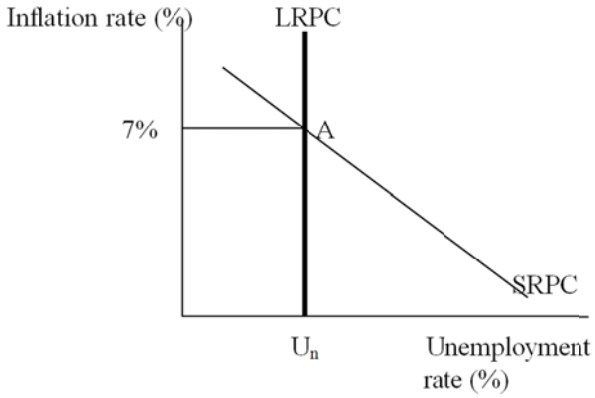


Figure 4.13

Consequently, the relationship between LRPC and SRPC is the mirror image of that between LRAS and SRAS. The long-run aggregate supply curve told us that any anticipated price was possible at the natural level of output: actual GDP equals potential GDP. In the same way, the long-run Phillips curve tells us that any anticipated inflation rate is possible at the natural unemployment rate.

When the expected price level changes, the short-run aggregate supply curve shifts upward, but the long-run aggregate supply curve does not shift. Similarly, when the expected inflation rate changes, the short-run Phillips curve shifts up, but the long-run Phillips curve does not shift.

Therefore, for every long-run curve there is a family of short-run curves, each associated with a different expectation level.

Costs of inflation

Why are high inflation rates bad? If you ask the typical person that question, he or she will tell you inflation robs people of their purchasing power of their earnings.

However, inflation means not only increasing prices but also expanding nominal incomes as well. The effect on households' purchasing power depends on which is greater, the inflation rate (the rate of increase in the average price) or the increase in nominal income.

If a household's nominal income increases steadily every year but inflation is at a higher rate, the household suffers from losses of purchasing power. If, in contrast, the same household has a nominal income that increases at roughly the same rate as inflation, the household maintains its purchasing power. Therefore, whereas some households may feel the full impact of inflation on living standards, others may have the impact cushioned by income adjustments. Of course, others may even benefit from inflation because their nominal income rises more quickly than inflation.

Since most people earn their incomes by selling their services, such as their labour, inflation in incomes goes hand-in-hand with inflation in prices. Thus, inflation does not in itself reduce people's real (purchasing power) income. The damaging aspect of inflation for society is that it redistributes (income) wealth among individuals in an *arbitrary* way. The winners are often those with substantial economic resources, while the losers are usually those least able to withstand a drop in purchasing power.

Redistribution effect of inflation

Inflation tends to redistribute income (or wealth): some households lose while others win. The biggest losers are those whose income is not fully indexed. When workers' incomes are automatically increased by the rate of inflation, these are called *fully indexed* incomes. In this case, nominal income rises at the same rate as prices, so real income stays the same. Other people may receive incomes that are only partially indexed or not indexed at all (fixed). These are typically *fixed income* earners: for example, pensioners. Fixed incomes are those that stay at the same nominal dollar amount and do not change in response to inflation. The winner in this case is the government, which has collected from the public more valuable tax dollars, before prices rose, to return them to the public with less valuable dollars at a later date (when prices have risen). In other words, a reduced real (after-inflation) fixed income to pensioners implies equally reduced real fixed payments (costs) to the government.

However, governments tend to adjust the loss of income of fixed-income earners to inflation with a formula known as COLA (cost of living adjustments). In practice, these measures are partial indexation

(adjustment) and their effect is that incomes rise more slowly than the inflation rate.

Another redistributive effect of inflation is on *borrowers and lenders*. When a lender lends funds at an interest rate that is not adjusted for inflation, the lender may lose out. In this case, the winner will be the borrower who has borrowed more valuable money only to return less valuable money at a later date.

To illustrate this, we need to distinguish between two types of interest rates, discussed briefly in Module 3.

1. The nominal (market) rate of interest, the interest rate expressed in money terms in daily financial reports and bulletins at your bank. For example, you borrow $100,000 for one year from a bank to start a business. Assume the borrowing rate is 10 per cent per annum. At the end of the year, you must pay back the principal ($100,000) plus interest (0.10 × $100,000 = $10,000), for a total of $110,000 ($100,000 + $10,000).
2. The real interest rate: the *real cost* of borrowing to you (or the real return to the bank). This is to be measured at a rate of interest that corrects for the inflation rate.

The real rate of interest is roughly equal to the nominal interest rate minus the rate of inflation.

Real interest rate = Nominal interest rate − Inflation rate

Now return to the same example but this time, assume that the inflation rate is 4 per cent in the year you borrow money for your business. In this case, the real cost of borrowing to you and hence the real rate of return to the bank (real interest rate) is 6 per cent – the 10 per cent nominal interest rate minus the 4 per cent rate of inflation. The real interest rate reflects the fact that because of inflation, the funds lent (the principal) have less purchasing power at the end of the one-year term than they did at the time the loan was made. Therefore, your bank receives $10,000 (10 per cent) in nominal interest at the end of the year, but only $6,000 (6 per cent) in real interest. Similarly, your real cost of borrowing is $6,000 and not $10,000.

Alternatively, we can write this equation to show that the nominal rate of interest is the sum of the real rate and the inflation rate.

Nominal interest rate = Real interest rate + Inflation rate

This way of looking at the equation is very useful because it shows in order for a lender, for example, to maintain a constant real rate of return (real interest rate) on his or her wealth, he or she must adjust its nominal lending rate (nominal interest rate) one for one to the changes in the rate of inflation. Once the nominal interest rate has been agreed upon, it is fixed. Therefore, lenders try to *anticipate* the rate of inflation for the loan period and build it into the nominal interest rate. This rate built into the

nominal interest rate is known as the *inflation premium*. Lenders, therefore, determine what real interest rate they desire and add an inflation premium to determine the nominal interest rate.

The adjustment of nominal rate of interest to the *expected* (anticipated) inflation rate is called the *Fisher Effect*, named after American economist Irving Fisher (early 20th century).

What happens if the inflation rate turns out to be higher than lenders anticipated? Suppose, in our previous example, the lender expects that the inflation rate to be 4 per cent in the current year. If the lender wishes to earn a real rate of return of 6 per cent he or she must then set the nominal rate at 10 per cent per year (real rate (6 per cent) = nominal rate (10 per cent) – expected inflation rate (4 per cent)). Now suppose the inflation rate turns out to be 7 per cent instead of 4 per cent. As a result, the bank actually receives only 3 per cent real interest – that is, the 10 per cent nominal rate minus the 7 per cent inflation rate. This is substantially less than the 6 per cent real interest rate the bank had anticipated.

Therefore, because the inflation rate is higher than anticipated, the real interest rate is lower than the desired real interest rate, and lenders are worse off while borrowers are better off. Borrowers, indeed, return less valuable dollars to lenders. Conversely, if the expected rate of inflation turns out to be less than the expected one, the losers and winners will be reversed – lenders lose while borrowers gain.

Study skills

If the nominal rate of interest is 6 per cent and the expected rate of inflation is 4 per cent, then the real interest rate is:

A. 2 per cent

B. 10 per cent

C. –2 per cent

D. actual inflation rate is equal to expected rate.

Solution:

A. The real rate of interest is equal to the nominal minus the rate of inflation (6-4 =2). D is wrong because there is not enough information to determine if the expected and actual inflation rates are equal.

Other impacts of inflation

Shoe-leather costs

Increases in the inflation rate cause increases in the nominal interest rate. Faced by this increase in the opportunity cost of money, individuals reduce their holdings of real money balances to economise on holding cash. Cash is, of course, subject to a greater deterioration than alternative assets that at least provide some kind of monetary return. Individuals, still in need of cash to finance their regular transactions but hold less money, must make more trips to the bank. Note that individuals' spending habits and monthly expenditures are not altered. The only thing that has altered

is that they hold less money and hence they have to visit their bank more frequently. These *trips* reduce leisure and/or time spent working, and are referred to as shoe-leather costs.

Tax distortions

Increases in inflation can increase the effective tax rate on consumers through a process called *bracket creep* by pushing them into higher income-tax brackets as their nominal income increases. If, for instance, the increases in individuals' nominal income are due to higher inflation – their pay cheques rising only to keep up with the rising cost of living – this will reflect only an increase in nominal income and not an increase in consumers' *real income*. However, unless the income tax system is fully indexed, these individuals will end up in a higher tax bracket and will, inevitably, pay higher taxes. This change would not occur in a fully indexed tax system because the tax bracket would not change when the nominal income did. Increases in inflation also affect capital gain taxes, even though the real value of the taxed asset has not changed. The same logic applies again.

Confusion and money illusion

As inflation increases, decision making becomes more challenging, and certain computations become more difficult. Higher inflation tends to mask the real earnings of individuals. Evidence suggests that rising earnings, salaries, wages and other sources of income are more likely to be mistaken for increases in real income in an environment of *higher* inflation than in one of *lower* inflation.

Inflation variability

Another problem with inflation is that often, as inflation rises, it becomes more variable too. It is the variability that makes lending and borrowing more risky. One implication is that bond holding becomes riskier.

Inflation tax

If inflation is so bad, why do the central banks of these countries choose to print so much money that its value is certain to fall rapidly over time?

The answer is that the governments of these countries are using money creation as a way to pay for their spending. When the government wants to build roads or pay salaries to civil servants, for example, it first has to raise the necessary funds. Normally, the government does this by levying taxes such as income and sales taxes. In countries with well-developed financial markets, the government can raise funds by borrowing from the public by selling government bonds. A third option, widely used in developing countries, however, is for the government to pay for its spending by simply printing the money it needs.

When the government raises revenue by printing money, it is said to levy an *inflation tax*. The inflation tax is not exactly like other taxes, however, because no one receives a *bill* from the government for this tax. Instead, the inflation tax is more subtle. When the government prints money, the

price level rises and the ringgit in your wallet are less valuable. Thus, the inflation tax is like a tax on everyone who holds money.

The benefits of inflation

The recent experience with several *deflationary* situations in countries such as Japan has reminded us of an important fact that deflation can be more dangerous than inflation. To understand this point, recall the Fisher equation, (real interest rate = nominal inflation minus expected inflation). When the inflation rate becomes negative (deflation), the real rate of interest rises. The problem with a scenario such as this becomes more evident when lower, and not higher, interest rates are desired as in when central banks wish to jump-start the economy or calm the financial markets down.

To appreciate this point, note that central banks can change nominal interest rates, not real rates – at least not directly. The study of business cycles of the last several decades points out that central banks facing recessions have counted on negative real interest rates in order to give the economy a boost. This is achieved by lowering the nominal interest rates below the rate of inflation. The problem arises, however, when the rate of inflation is zero or below zero: deflation. In such circumstances, not only are central banks unable to bring about a negative real rate of interest because the nominal rate cannot fall below zero, but also the deflation rate will be the only driving force behind the real rate of interest and hence the health of the economy.

Therefore, in instances where negative real interest rates are desired but cannot be achieved via lower nominal interest rates – since nominal interest rates cannot fall below zero – central banks may have to resort to higher inflation rates. However, if the inflation rate is stuck at zero per cent and lower, the real interest rate will never become negative and economic recovery may never start.

Unemployment

Unemployment is one of the two most serious macroeconomic problems, the other one being inflation, that affects people rather directly. For most people, the loss of a job means a reduced living standard and psychological distress. It is no surprise that unemployment is a topic of heated debate among politicians, academics and medical practitioners.

Table 4.1 below, shows the rate of unemployment – the percentage of the labour force unemployed – in several countries. The figure suggests that there is always some unemployment. This is true even when the economy is at natural level of output (full employment). This figure does not include the size of unemployment at full employment or you would see that this varies from a country to the next. A historical sequence would show you that the natural rate of unemployment does not stay constant within a given country either.

Country	Unemployment Rate (%) (2002)
Australia	6.3 (May)
Belgium	10.4 (May)
Britain	5.2 (April)
Canada	7.7 (May)
Spain	11.4 (May)
Sweden	2.0 (April)
USA	5.8 (May)
Euro area	8.3 (May)

(**Source**: The Economist, July 2002)

Table 4.1

Economists study unemployment to identify its causes and to help improve the public policies that affect the unemployed. Some policies such as job-training programmes, help people to find employment. Others such as employment insurance, alleviate some of the hardships that the unemployed face. Still, other policies affect the prevalence of unemployment inadvertently. Laws mandating a high minimum wage, for instance, are widely thought to raise unemployment among the least skilled and experienced members of the labour force. By showing the effects of various policies, economists help policymakers evaluate their options.

In this section, you begin your study of unemployment by looking at some of the relevant facts that describe unemployment, including why there is always some unemployment and what determines its level. The problems associated with unemployment are usually categorised into two groups: the long-run and short-run problems. The long-run unemployment problem refers to the natural rate of unemployment, a normal state of unemployment that an economy tends to in the long run. The short-run problem is associated with *cyclical* unemployment: year-to-year fluctuations in unemployment around its natural rate.

The labour force survey

Statistical agencies around the world keep track of their respective workforces through a monthly survey of labour force participation. These households are a random sample of the labour force population, which includes all residents of the country above certain legal age (15 in Canada) with some exceptions that tend to vary from one country to the next. The labour force is made up of those who either have jobs or are actively seeking employment. By its definition, the labour force leaves out those who have given up looking for a job, as well as full-time homemakers who, while they work, do not do so in the formal job market.

The official unemployment rate

The answers to survey questions enable statistical agencies to place each adult in each surveyed household into one of three categories:

- employed
- unemployed
- not in the labour force.

A person is considered employed if he or she spent most of the previous week (or weeks) working at a paid job. A person is unemployed if he or she is on temporary layoff looking for a job, or is waiting for the start date of a new job. A person who fits neither of the first two categories, such as a full-time student, homemaker or retiree, is not in the labour force.

$$Labour\ force = Number\ of\ employed + Number\ of\ unemployment$$

$$Unemployment\ rate\ (\%) = \frac{Number\ of\ unemployed}{Labour\ force} \times 100$$

Another valuable piece of information that statistical agencies tend to produce from their labour survey is the labour-force participation rate. The participation rate measures the percentage of the total adult population that makes up the labour force.

$$Participation\ rate\ (\%) = \frac{Labour\ force}{Adult\ population} \times 100$$

Study skills

Assume that in the year 2002, the size of the local adult population is 40 million, 25 million people were employed, and 3 million were unemployed. Based on this information:

1. The size of the labour force is
   - A. 25 million
   - B. 28 million
   - C. 40 million
   - D. 3 million

2. The unemployment rate is:
   - A. 2 per cent
   - B. 7 per cent
   - C. 10.7 per cent
   - D. Cannot be calculated from this information.

3. The participation rate is
    A. 70 per cent
    B. 62.5 per cent
    C. 12 per cent
    D. None of the above.

Solutions:

1. B. Labour force = unemployed + employed (3 + 25 = 28).
2. C. Unemployment rate is the ratio of the number of unemployed to the labour force (3/28).
3. A. The participation rate is the ratio of the labour force to adult population (28/40).

Drawbacks of the official unemployment rate

Because of the way the official unemployment rate is calculated, it may either understate or overstate the true level of unemployment. Critics of this official rate point primarily to the following factors: underemployment and discouraged workers.

Underemployment

The official unemployment rate makes no distinction between part-time and full-time employment, nor does it reflect the appropriateness of the work. While some part-time workers prefer part-time work, others favour full-time work if it were available.

Furthermore, in some circumstances, some workers may have to work at jobs that do not fully utilise their skills and education. This is a typical problem in developing countries, especially in the public sector and though less prevalent in developed countries such as Canada, it is still apparent. The most important example is that of a reasonably large number of highly educated recent immigrants to Canada who have been unable to quickly secure a job that matches their skills and education.

Discouraged workers

Discouraged workers are those who, after a period of searching for a job unsuccessfully, have given up looking. The official unemployment rate does not consider them unemployed because they are not actively looking for a job. They are, in fact, not considered part of the labour force. In other words, they are non-employed but not unemployed (or jobless).

Anatomy of unemployment

How do people become unemployed? How do they end unemployment? These are two of the most important questions that motivate the study of the labour market. Here we try to address these and other questions.

In a typical labour market, the following characteristics can be observed:

1. Large variations in unemployment rates across age groups.
2. Large variations in unemployment rates across regions in large and diversified countries, especially those subject to disparate impacts in different regions.
3. Each month, substantial movement of individuals in and out of unemployment – either to employment or out of the labour force, most of those who have become unemployed in any given month remaining unemployed for only a short period of time.
4. Much of the unemployment rate representing people who will be unemployed for a long period of time.

The unemployment pool

Any time there is a given number or pool of unemployed people, there are flows in and out of the unemployment pool.

Workers may become unemployed for one of the following reasons:

1. Loss of a job through dismissal, layoff or closing down of a firm, followed by searching for another job. A layoff means that the worker was not fired and will return to the old job if demand for the firm's product recovers.
2. Quitting a workplace and searching for another job.
3. Entering or re-entering the labour force to search for a job.

Individuals may end a spell of unemployment if they:

1. Are hired or (in the case of laid-off persons) recalled.
2. Withdraw from the labour force by stop looking for a job and thus, by definition, leave the labour force.

Unemployment is rising when more people are entering the pool than leaving. Thus, other things being equal, increases in quits and layoffs increase unemployment as does an increase in the flow of new entrants into the labour market. For a country such as Canada, job loss accounts for about half of new unemployment. Voluntary separations, new entrants and re-entrants into the labour force together account for the other half.

As illustrated in **Figure 4.14**, there are always discouraged workers who leave the labour force from the unemployment pool while some find a job or are recalled. There is always a percentage of employed persons who become unemployed or laid off, while another group leaves the labour force permanently (into retirement) or temporarily (on maternal leave, for example). Finally, at any point, some individuals who are out of the labour force go directly to employment by ending a leave of absence, etc., and some join the unemployment pool in search of a job.

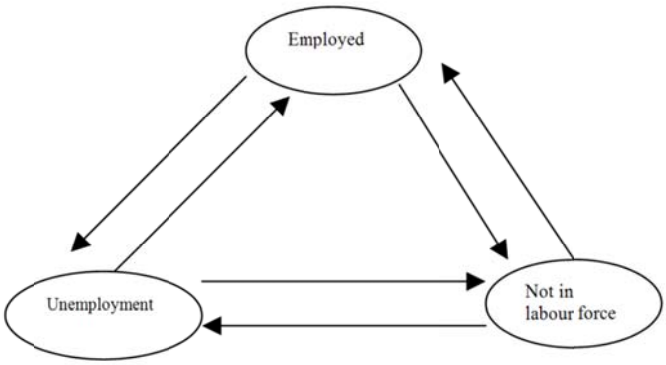


Figure 4.14 (Labour market dynamics)

Types of unemployment

When examining unemployment, you can distinguish among four types: frictional, structural, cyclical, and seasonal.

Frictional unemployment

Workers who are temporarily between jobs or have begun looking for their first jobs are experiencing *frictional unemployment*. There are always people who are entering the labour force for the first time or who have quit their jobs in search of a new and better one. The size of this type of unemployment varies from one country to the next and depends on the labour market institutions, customs, labour laws and manpower and employment policies. Nonetheless, the, frictional unemployment is a permanent feature of the labour market.

Structural unemployment

Another type of unemployment arises largely from structural changes in the economy. *Structural unemployment* is due to a mismatch between people and jobs. Unemployed workers cannot fill the jobs that are available. This type of unemployment occurs primarily because of changes in technology and the phenomenon of globalisation that tend to introduce sectoral shifts and workplace demands for new required skills.

Sometimes, distance may be responsible for this type of unemployment: a skilled person may possess the required qualifications for an available job but the work site location may keep them apart. In this case, the job remains vacant and the individual remains structurally unemployed from lack of willingness or inability to relocate.

Because of these changes, workers lose out; they are displaced. Consider a worker who loses her job in manufacturing because of applications of robotics. She might not yet have the skills for operating the robots in order to stay in manufacturing, nor might she have the necessary skills for the expanding service sector, if she chooses to leave the manufacturing industry. In the same way, an unemployed fisherman living in a remote village cannot easily take advantage of employment opportunities

elsewhere. Because gaining new skills, moving to obtain work elsewhere and developing new industries in a region all take time, structural unemployment can persist for long periods.

Cyclical unemployment

Cyclical unemployment is primarily caused by fluctuations in spending; it is demand- driven. A car worker, for example, may work overtime in periods of strong consumer demand for cars but be laid off when the economy weakens.

Seasonal unemployment

In some industries agriculture, fishing, construction, and tourism, for example – work is seasonal, with unemployment rising during winter months and some workers becoming seasonally unemployed during spring and summer. Clearly, in many resource-or tourism-based economies, seasonal unemployment can be significant.

Full employment

The notion of full employment (or the natural level of employment) plays a central role in macroeconomics and also in macroeconomic policy. This section starts by discussing the theory of the natural rate and then turns to examining estimates of the rate.

Defining *full employment* is a tricky task. Full employment is the highest reasonable expectation of employment for the economy as a whole – a natural unemployment rate. Natural rate of unemployment consists of frictional and structural unemployment but traditionally excludes cyclical unemployment. This rate also excludes seasonal unemployment, which is already omitted from the official unemployment rate.

Determinants of the natural rate

The natural rate of unemployment depends on following factors:

1. The organisation of the labour market, including the presence or absence of employment agencies, youth employment services and the like.
2. The demographic makeup of the labour force: e.g., the increase in the number of households with two paid workers or a change in the birth rate or migration.
3. The availability of unemployment compensation that tends to affect the ability and desire of the unemployed to keep looking for a better job.
4. The pace and the direction of technological changes.
5. Minimum wage laws that affect the employability of teenagers and workers with few employable skills.

Increases over the past few decades in both the actual and the natural unemployment rates represent worrisome trends. How can a country reduce its natural rate of unemployment?

Reducing the natural rate of unemployment

At any time, there are people who quit their jobs in search of another. This is one reason why economies always experience some unemployment – job search. Job search is the process of matching workers with appropriate jobs. If all workers and all jobs were the same so that all workers were equally well suited for all jobs, job search would not be a problem. Laid-off workers would quickly find new jobs that were well suited for them. However, in fact, workers differ in their tastes and skills, jobs differ in their attributes and information about job candidates and job vacancies is disseminated slowly among the many firms and households in the economy. Therefore, some unemployment is inevitable.

Frictional and structural unemployment are inevitable simply because the economy is always changing. For instance, 100 years ago, the biggest sources of employment in a country such as Canada were the primary sector (agricultural, mining, fishing, etc.) and manufacturing. Today, the service sector comprises the largest employers in the Canadian economy, capturing near 70 per cent of total employment. Recent estimates for Canada indicate that the mismatch between available jobs and people seeking employment explains the unemployed plight of roughly one out of eight jobless persons in the labour pool.

Public policy

The fact that frictional and structural unemployment cannot be avoided is no reason for complacency. There are several steps that governments can take to reduce the natural rate of unemployment. For instance, the faster information spreads about job openings and worker availability, the more rapidly the economy can match workers and firms. Better and more efficient government manpower and employment centres can facilitate job search by reducing the time it takes for unemployed workers to find a job and hence help reduce the economy's natural rate of unemployment.

Another public policy would be public training programmes, which aim to ease the transition of workers from declining to growing industries and to help disadvantaged groups escape poverty. This way, the government can help reduce the structural component of the natural rate of unemployment.

Unemployment insurance

It is possible that the existence of the *unemployment insurance programmes* may have an effect on the unemployment rate. The effect of such programmes on unemployment rate depends on the *replacement ratio*. Replacement ratio is the ratio of the unemployment compensation (to be paid while unemployed) to after-tax income (while employed). The higher the ratio, the less urgent it will be to have a job. The presence of unemployment benefits allows longer job search by raising the replacement ratio and reducing the urgent need to take a job. A related point is that in the absence of unemployment benefits, some people might not be in the labour force. But in order to collect unemployment

compensation, they have to be *in the labour force*, looking for work even if they do not really want a job.

In general, substantial evidence suggests that unemployment benefit programmes tend to increase the participation rate as well as the average duration of unemployment, so they help increase the rate of unemployment. This does not imply, though, that unemployment compensation should be abolished. Individuals need time to conduct a reasonably long job search if the economy is to allocate people efficiently among jobs. It would not make sense to put a skilled worker in an unskilled job the moment she loses her previous job, just because the worker cannot afford to search. Thus, even from the viewpoint of economic efficiency, zero is not the ideal level of unemployment benefits. Beyond that, society may be willing to give up some efficiency so that unemployed people can maintain a minimal standard of living. What is appropriate is a scheme that will create less incentive for firms to lay off labour while at the same time ensuring that the unemployed are not exposed to economic distress. This is obviously a tough and controversial issue.

Minimum wages

Although minimum wages are not the predominant reason for unemployment, they have an important effect on certain groups with particularly high unemployment rates. **Figure 4.15** reviews the basic economics of a minimum wage. When a minimum-wage law forces the wage to remain above the level that balances supply and demand, it raises the quantity of labour supplied and reduces the quantity of labour demanded, compared with the equilibrium level, giving rise to a *surplus of labour*. Because there are more workers willing to work than there are jobs, some workers are unemployed.

In **Figure 4.15**, L_d is the quantity of labour demanded, Ls is the quantity of labour supplied, and (L_s - L_d) is the size of the surplus. Note that the portion (L^* - L_d) represents displaced workers, while the portion (L_s - L^*) is the increased number of job seekers motivated by higher wages.

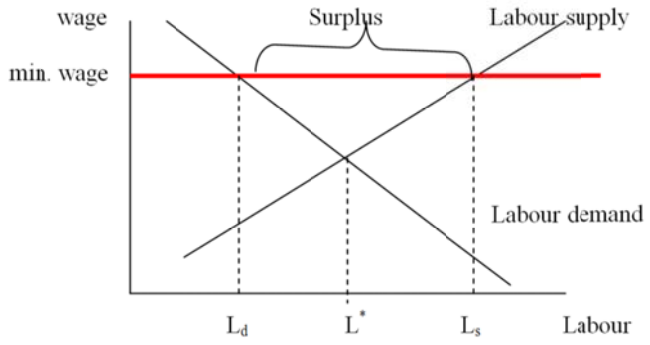


Figure 4.15

Minimum-wage laws are just one reason why wages may be too high. There are two other reasons why wages may be kept above the equilibrium level:

1. Unions and collective bargaining.
2. Efficiency wages.

Unions and collective bargaining

A *union* is a worker association that bargains on behalf of its members (workers) with employers over a wide range of issues, including wages and working conditions. Union membership, defined as a percentage of the non-agricultural labour force, tends to be different in different countries (Sweden is at the high end with 75 per cent and the U.S. at the low end, with 16 per cent). Furthermore, the proportion of union membership (unionisation rate) tends to also vary from one sector to the next. In industrial countries, the manufacturing sector has one of the highest unionisation rates whereas the service sector tends to be at the low end.

Collective bargaining is the process by which unions and firms agree on the terms of employment. Evidence suggests that in most countries where there is a strong tradition of collective bargaining and where unions are deeply rooted, unions have enabled unionised workers to enjoy a considerably higher wage level than that of their non-unionised counterparts.

Reservation wage and efficiency wage

For workers who are engaged in the job search process, *reservation wage* is the wage at which accepting a job offer has as much appeal to workers as rejecting it to stay unemployed and prolong their job search period. At this wage level, the cost to workers of remaining unemployed, while continuing their job search, is equal to the benefits of not accepting a job offer. Therefore, workers would be indifferent towards the choice between accepting and not accepting a job offer at this wage level.

Efficiency wage is the level above the reservation wage that firms pay workers in order to:

1. increase the chances that productive workers will stay with the firm, and
2. increase the cost to workers of losing their jobs if they are found shirking.

This incentive reduces job turnover.

Costs of unemployment

As individuals, unemployed people suffer both from their income loss and from the related social problems that long periods of unemployment cause. Society on the whole loses from unemployment because output is driven below its potential level.

As suggested by *Okun's Law*, when the output of the economy grows beyond a certain normal rate, which tends to vary from country to county, the unemployment rate drops.

The typical adjustment pattern of labour use during a recession is as follows.

1. Employers first adjust hours per worker – for example, by cutting overtime – and only trim their workforce.
2. Layoffs and firings increase, increasing the flow into unemployment. However, at the same time, quits decrease as workers decide to hold on to their current job.
3. It is possible that during a prolonged recession, many of the unemployed become discouraged and leave the labour force, making the official unemployment rate lower than it would otherwise be. As a result of all these effects, unemployment changes usually lag behind output changes.

Module summary

Summary

This module has offered the basic for understanding the functions of money, definitions of money supply and the motives for holding money. You have been introduced to various financial institutions, system participants and the implementation of monetary and fiscal policies. Governments use monetary policy to influence spending and output through interest rates, money supply and reserves to banks for the ultimate objective of monetary policy of price stability. Governments use either expansionary or contractionary stabilisation policies to minimise ups and downs in the business cycle. The fiscal policy affects spending and output through taxes and government purchases.

You have also reviewed the concepts of inflation, unemployment, categories of unemployment, their impacts and the weaknesses of unemployment rate which does not take into account underemployment, discouraged workers, and dishonest answers given in the labour market surveys. You have learnt that the short-run Phillips curve shows a trade-off between unemployment and inflation.

In the following study units, you will be looking in area of an open economy with the components of balance of payments accounts, exchange rates regimes, foreign exchange markets, interest rate parity, international trade and trade policy.

Assignment

Assignment

1. Explain how a decrease in government expenditures affects the position of the aggregate-demand curve.
2. What are the major tools of monetary policy?
3. What are the popular monetary policy tools in your country?
4. What is the banking multiplier?
5. What is the relationship between reserve ratio and the multiplier?
6. In what way can banks create deposits and money?
7. What are the major assets of the central banks?
8. What are the major liabilities of central banks?
9. Explain the term marginal propensity to consume.
10. What is the government spending multiplier?
11. Why is this multiplier greater than one?
12. What is the crowding-out effect?
13. What does the size of the crowding-out effect depend upon?
14. What are the automatic stabilisers?
15. What are a budget deficit and a budget surplus?
16. What are the two ways a government can finance a budget deficit?
17. What is meant by debt monetisation?
18. Who is helped and who is harmed by deflation?
19. What is the Quantity Theory of Money?
20. Why does a minimum wage have virtually no effect for skilled workers?
21. Define the natural rate of unemployment and explain its determinants.
22. What are the components of the labour force?
23. What does the reservation wage represent?
24. What does the efficiency wage represent?
25. Why do firms and workers care about real wages?

Assessment

Assessment

1. What is the theory of liquidity preference? How does it help explain the downward slope of the aggregate-demand curve?

2. Use the theory of liquidity preference to explain how a decrease in the money supply affects the aggregate-demand curve in a closed economy.

3. The government spends $100 million on health care. Explain why aggregate demand might increase by more than $100 million.

4. Suppose that survey measures of consumer confidence indicate a wave of pessimism is sweeping the country. If policymakers do nothing, what will happen to aggregate demand? What should the central bank do if it wants to stabilise aggregate demand?

5. Give an example of a government policy that acts as an automatic stabiliser. Explain how this policy works this way.

6. The Malaysian economy is in recession and has a large recessionary gap during the period of East Asian financial crisis erupted in mid-1997. Describe what automatic fiscal policy might occur. Explain a fiscal stimulus that could be used that would not increase the budget deficit.

7. Explain how each of the following developments would affect the supply of money, the demand for money and the interest rate. Illustrate your answers with diagrams.

    A. The central bank buys bonds in open-market operations.

    B. An increase in credit card availability reduces the cash people hold.

8. Suppose banks install automatic teller machines on every block and, by making cash readily available, it reduces the amount of money people want to hold.

    A. Assume the central bank does not change the money supply. According to the theory of liquidity preference, what happens to the interest rate? What happens to aggregate demand?

    B. If the central bank wants to stabilise aggregate demand, how should it respond?

9. Suppose the government reduces taxes by $20 billion. Also suppose that there is no crowding out of investment and that the marginal propensity to consume is 3/4.

    A. What is the initial effect of the tax reduction on aggregate

demand?

B. What additional effects follow this initial effect? What is the total effect of the tax cut on aggregate demand?

C. How does the total effect of this $20 billion tax cut compare with the total effect of a $20 billion increase in government purchases? Why?

10. Is it possible, or advisable, for central banks to attempt fine-tuning for monetary policy? If the answer is yes, what monetary measures could be used to implement such a policy?

11. Discuss the ways in which a persistent budget deficit could lead to inflation.

12. Respond to the following questions:

    A. Discuss the effects of higher expected inflation on bond markets.

    B. Explain what the authorities might hope to achieve by raising interest rates at an early stage of the upward cycle.

13. Suppose you are given the following information about your economy. Public deposits with commercial banks total $600 billion. Banks hold $6 billion deposits at the central bank and keep $6 billion ringgit in notes and coins in the vault. There are $120 billion notes and coins outside bank (in the hands of the public). Calculate:

    A. The high-powered money.

    B. The money supply.

    C. Banks' reserve ratio.

14. Discuss why high unemployment should be a matter of concern not just for the unemployed but also for business.

15. What has inflation been in your country for the last decade? What have been the determinants of this inflation?

16. Name a developing country that has experienced high inflation and has been able to implement a successful stabilisation programme.

17. Sketch a diagram consisting of AD, SRAS and LRAS. Assume the economy starts from a long-run equilibrium point, where all three curves have a common intersection point.

    A. Illustrate the initial effects of an event that increases the aggregate demand curve.

    B. Show what happens beyond the short run. How does the economy adjust to the long-run equilibrium?

18. In the economy described in question 4,

    A. Illustrate the initial effects of an event that may cause a cost-

push inflation.

B. Show what happens beyond the short run. How does the economy adjust to the long-run equilibrium?

19. "Over time, long-run changes in aggregate supply are the key determinants of changes in real output". Evaluate this statement, using evidence from the chapter.

20. An economy with a natural rate of unemployment rate of 6 per cent and an expected inflation rate of 5 per cent a year has the following inflation and unemployment history:

Year	Inflation rate (%)	Unemployment rate (%)
1998	9	4
1999	7	5
2000	5	6
2001	3	7
2002	1	8

A. Draw a diagram of the short-run and long-run Phillips curves for this economy.

B. Is this economy initially in long-run equilibrium? Why? Or Why not?

C. If the government pursues an expansionary policy that raises inflation from 5 per cent a year to 7 per cent, what is the change in the unemployment rate? Why?

21. List the costs and the benefits of inflation.

22. Suppose the nominal rate of interest is 3 per cent.

A. Calculate the real rate of interest when inflation rate is equal to: -5 per cent, 0 per cent, 2 per cent and 7 per cent.

B. What happens to the real rate of interest when inflation rate rises?

C. Why do you think policy makers may want a negative real rate of interest?

23. Use the information provided below to answer the following questions.

Civilian population	30
Employed	15
Unemployed	0.5

A. What is the size of the labour force?

B. How many individuals are "out of the labour force"?

C. Calculate the participation rate.

D. Calculate the unemployment rate.

24. Use the information provided below to answer questions 1 to 3

Civilian population	200 million
Employed	100 million
Unemployed	6 million

(a) The labour force for this economy is:

A. 100 million

B. 106 million

C. 194 million

D. 200 million

(b) The unemployment rate for this economy is:

A. 6/100 = 6 per cent

B. 6/106 = 5.7 per cent

C. 6/194 = 3.l per cent

D. 6/200 = 3 per cent

(c) The labour force participation rate is:

A. 100/200 = 50 per cent

B. 94/200 = 47 per cent

C. 94/100 = 94 per cent

D. 106/200 = 53 per cent %

Assessment answers

1. The theory of liquidity preference is the theory of demand for money in which the determinants of liquidity (money) and alternative forms of financial assets, such as bonds, are discussed. This theory holds that the public's holding of liquidity is inversely related to the rate of interest. Accordingly, an increase in the price level reduces the real money supply, causing the interest rate to increase, which in turn tends to lower investment spending and hence to lower the aggregate demand.

2. When money supply decreases, interest rates rise and this causes investment spending and hence aggregate spending (demand) to fall.

3. Any time the level of spending increases, it sets in motion a chain reaction of further spending, giving rise to the notion of 'spending multiplier.' Therefore $100m fresh spending on health will bring about further spending by creating more income.

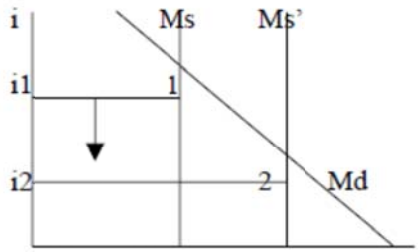
4. Aggregate demand decreases as consumers and investors withdraw from the market. In order to offset this, an increase in money supply (lower interest rate) will be necessary. This will keep aggregate demand intact.

5. The income tax system is an example of an automatic stabiliser. When the economy is shrinking and income and employment are dropping, the government revenue from taxation (proportional to income) drops to alleviate the pressure, and vice versa.

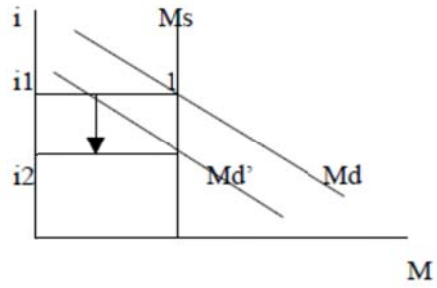
6. Discuss your answers with your tutor.

7. Answers as follows:

   A. Money supply increases, interest rates drop, and the demand for money increases (from point 1 to 2).



   B. Money demand drops, interest rates drop. The lower interest rate (i_2) restores money demand to its original level. Money supply stays unchanged.



8. Answers as follows:

   A. The interest rate decreases as a result of a fall in money demand that has been caused by increased use of credit cards. Investment spending, aggregate spending and aggregate demand increase.

   B. The central bank should reduce money supply to stabilise aggregate demand.

9. Answers as follows:

   A. The initial effect of a tax reduction of $20 billion is an increase in the disposable income by $20 million and hence an increase in consumption spending by (¾ x $20b) = $15b.

   B. This causes a further increase in income and hence further spending. At the end, aggregate demand will have risen by the initial impact times the multiplier:

$$\left(\$15x \frac{1}{1-3/4} \right) = \$60$$

   C. If instead the government spending rose by $20, the total effect would be

$$\left(\$20x \frac{1}{1-3/4} \right) = \$80$$. This is the case because

   when the government expenditure increases by $20, the entire increased expenditure enters aggregate spending ($20), whereas when taxes decrease by $20, only ¾ of it ($15) enters aggregate spending in the form of increased consumption spending; the remaining ¼ of it ($5) is saved.

10. Fine tuning is typically dangerous because of: (a) the complex nature of the economy, (b) information problem, and (c) lags in effectiveness of monetary policy.

11. Persistent budget deficits lead to a growing national debt. Also, unable to balance their budgets, governments may have to resort to

printing money to finance their deficit, a tactic which can lead to inflation.

12. Answers as follows:

    A. Higher expected inflation gives rise to an increase in nominal interest rate. Bond markets usually do not like high inflation rates, but since higher nominal interest rates increase the opportunity cost of holding money, the demand for bonds increases.

    B. The authorities might hope to pre-empt the possibility of a future inflation.

13. Answers as follows:

    A. High-powered money = currency in circulation plus banks reserves (120+12) = $132.

    B. Money supply = currency in circulation plus deposits with banks = (120 + 600) = $720.

    C. Reserve ratio = $\frac{12}{120} = 10\%$.

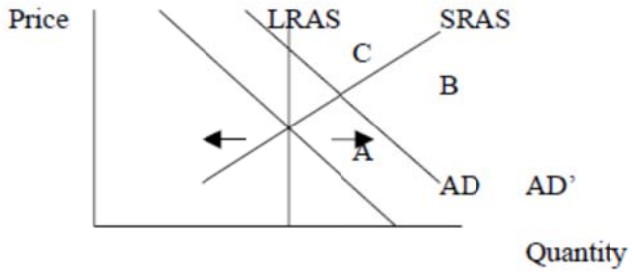
14. High unemployment means less output and (less demand for output, since there is less income). Profits diminish. The firms' share prices in the stock market drop, making it more difficult for the firms to raise funds or to borrow.

15. The answer depends on your specific example. There is no one single answer. One thing that can be said, however—for all possible scenarios—is that in all likelihood the resulting inflation would be related to high growth of money supply.

16. Argentina

17. Answers are as follows:

    A.



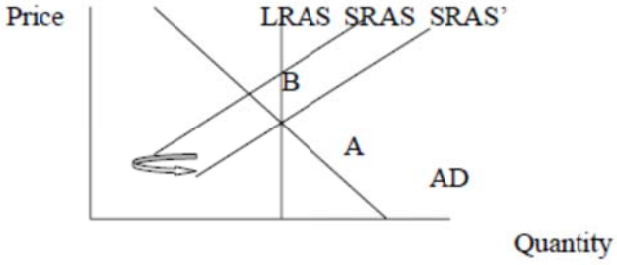
    Price and GDP rise when AD increases in the short run, point B.

    B. Beyond that, the expected price rises, SRAS shifts back until it reaches LRAS at C (on AD').

18. Answers are as follows:

    A. A cost-push inflation arises from a leftward shift in SRAS. This change, caused by a greater wage demand of a rising raw material price, gives rise to higher prices and lower GDP.

    B.

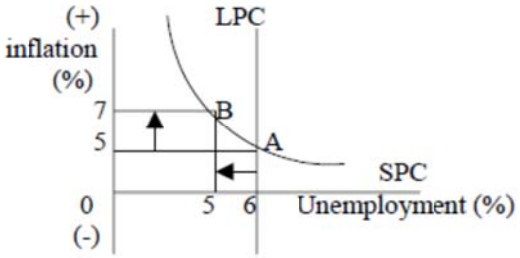


    In the next phases, SRAS shifts back toward its original position.

19. True. Long-term growth is a function of technological changes. Fiscal and monetary policy is not directly relevant.

20. Answers are as follows:

    A.



    B. Yes, because $P = P^e$ and $U=U_n$

    C. Unemployment drops along SPC to B to 5%. More spending triggers more business activity and more jobs.

21. Costs of inflation: Redistribution of income and wealth, to the detriment of fixed income earners. Distortive effects on the economy, causing misallocation of resources; investment suffers; inflation tax. Benefits of (low) inflation may be viewed in terms of its impact on the job market. At zero inflation rate, unemployment may increase permanently.

22. Answers as follows:

    A. r = 3 – (−5) = 8%; r = 3 – (0) = 3%, r = 3 – (2) = 1%, r = 3 – 7% = – 4%

    B. It rises.

    C. A negative real rate may be necessary to jump-start the economy.

23. Answers as follows:

A. 15.5

B. 14.5

C. $\frac{15.5}{30} = .51 = 51\%$

D. $\frac{.5}{15.5} = .032 = 3.2\%$

24. Answers as follows:

(a) B. (106 million)

(b) B. (6/106) = 5.7%

(c) D. (106/200) = 53%