Module 3

The Macroeconomy: Aggregate Demand and Supply

Introduction

In this module, we will first discuss the concept of Gross Domestic Product (GDP) and different approaches of measuring GDP as a measurement of national economy activities, people's income and well-being. You will examine the differences between GDP and Gross National Product (GNP) as well as nominal GDP and real GDP. You will also learn how unemployment rate, GDP deflator and Consumer Price Index (CPI) are determined.

Then we will examine the changes in economic forces that result in fluctuations in economic and business activities including determinants of aggregate demand and aggregate supply and impacts of shifts in aggregate demand and supply to economic fluctuations.

At the end of this module you will be able to:

Outcomes

- *define* Gross Domestic Product (GDP).
- *account* for the different approaches to measuring GDP.
- *distinguish* between nominal GDP and real GDP.
- *state* how the unemployment rate is defined and describe how it is determined.
- *explain* the definition and construction of the GDP deflator and the Consumer Price Index (CPI).
- *describe* some predictable interactions among demand, aggregate production and income.
- *state* the characteristics and determinants of the components of aggregate demand.
- *state* the conditions in which demand equilibrium is likely in goods and financial markets.
- *list* the determinants of aggregate supply.
- *describe* in what way the labour market differs from the product market.
- *state* what is meant by general equilibrium.

- *explain* some aspects of output determination in the short run that differ from those which prevail in the long run.
- *define* recessionary and inflationary gaps.
- *comment* on the effects that government policy tends to have in the short-run versus its long-term effects.
- *state*, in general terms, how shifts in aggregate demand or supply can cause booms and recessions.

Terminology

Terminology

Consumer price index (CPI)	A measure of the price level that considers the price of a list of specific goods and services purchased by a typical household at current prices.
Deflator:	An average of the prices of all goods in the economy, weighted by the quantities of those goods that are actually purchased.
Gross domestic product:	Total income earned domestically. It includes income earned domestically by foreigners, but it excludes income earned by domestic residents on foreign ground.
Gross national product:	Total income earned by nationals. It includes the income that nationals earn abroad but it does not include the income earned within a country by foreigners.
Inflation rate:	The percentage of change in the price level is called inflation rate. The measure of inflation most frequently cited is the CPI (Consumer Price Index).
Marginal Propensity to Consume (MPC)	The additional consumption spending generated by an additional amount of disposable income. Value of MPC is assumed to take a value less than unity.
Marginal Propensity to Save (MPS)	The additional household saving generated by an additional amount of disposable income.
Exchange rate:	The value of one nation's currency in terms of currency of another nation.

Measures of Economic Question

Introduction

Section 3.1 of Module 3 is designed to increase the accuracy and power of your economic vocabulary by spelling out the strict meaning of economic measurement terms that you encounter often in business reading. Exercises help you to grasp and remember distinctions between similar kinds of measures and indices. You will also have a chance to reflect on certain problems of aggregation such as those which arise in the measurement of a nation's productivity when many of its passport holders are employed outside its boundaries.

Management and measurement

Business managers normally make decisions specific to their department or part of the firm. These decisions usually take into account the concerns of the company as a whole and, at times, are subject to wider industry or market conditions. But how do you describe and measure such conditions?

In this section, we will focus on the main measures of economic questions. Fluctuations in economic questions set the conditions within which the market, industry and company must operate, and these measures reflect those fluctuations. There are many measures and indicators of overall (macroeconomic) questions such as the number of people with jobs, the total income of persons, the output of factories, the total quantity of goods and services produced in the economy, the unemployment rate, the consumer price index, retail sales, housing starts etc. Such measures are regularly reported in newspapers and television and radio news. At the least, well-equipped business and public sector managers must understand these economic indicators in order to be able to make informed business decisions. The following pages focus on the main measures of economic questions to provide you with a working knowledge of economic indicators.

Gross domestic product (GDP)

GDP is the most comprehensive measure of economies and a broad measure of people's income and well-being. The growth in real GDP is hence a measure of the growth of people's real incomes and therefore the pace of improvement in living standards. Differences in growth rates produce large differences in living standards between countries. Much of macro economics is about trying to understand the causes of growth and the reasons for persistent differences in growth rates and income levels between countries.

GDP can be viewed from either the demand side or the supply side. On the *demand* side, it provides insight into the interaction of the various decision-making sectors of the aggregate economy (households; business firms; government entities; and foreigners). A competent manager

recognises that these elements constitute the market demand that a firm faces.

The supply of goods and services requires firms to bring together the factors of production, particularly labour and capital, and to employ the best available technology in order to produce output that meets demand. As a manager, you need to be aware of these limits and any ongoing changes in them to manage your resources efficiently.

Sometimes economic growth is rapid and at other times it is slow. There are even occasions when the economy stops growing and actually shrinks for a period. A rapidly growing economy is one in which people enjoy rapidly rising living standards and in which good jobs are easy to find. In a slow-growing or shrinking economy, living standards decline and unemployment becomes a serious problem.

Unemployment rate

The labour market performance is measured by a number of indicators including the unemployment rate, the employment rate and the participation rate. The *unemployment rate* is the key and the most-watched indicator. At times when the unemployment rate is high, a person may take a long time to find a job. Today, the rapid pace of technological changes and the onslaught of globalisation are responsible for the widespread displacement of workers.

Although unemployment is a permanent feature of economic life, it sometimes becomes an extremely serious problem. One such time was the period of high unemployment and rapid contraction that occurred in the late 1920s and the 1930s throughout the world known as the Great Depression, which was to a great extent, the result of the collapse of the international financial system as well as mutual adoption by many countries in the West of high-tariff policies. In the West, we also witnessed other periods of high unemployment and stagnation in the early 1980s and the early 1990s although these were less severe than earlier in the century. The economic slump of the early1980s was primarily caused by a combination of a second oil price increase from OPEC (the Organization of Petroleum Exporting Countries) and the anti-inflation policies of the central banks of the developed oil-importing nations. The slowdown of the early 1990s perpetuated itself in Japan for at least ten years with a widespread impact in Asia.

Recently, dating back to 1997, the economies of major economic powers in Asia – Korea, China and Indonesia – have suffered serious financial and economic crises, as have many in Latin America and subsequently the economy of Russia as well.

Business decisions are increasingly made in an international context – the global economy is becoming increasingly borderless – so that macroeconomic thinking necessarily becomes broader to consider the international trade and finance flows that affect business. It is not enough for a manager to take into account the conditions that affect the domestic economy. Furthermore, attempts by governments to stimulate growth and

employment have often resulted in inflation and balance of payments crises.

Even when societies do achieve growth, it is often short-lived. This is especially true in developing countries where – for historical, sociological and economic reasons – governments take the central role not only in initiating stimulating economic packages but also in implementing them. In the absence of a reliable tax system, governments of developing countries often wind up financing their growth strategies by creating inflation.

In those nations that rely on regular tax channels for financing their growth strategies, the outcome is typically high foreign and domestic debts and the ensuing current account crises. As discussed in Module 1, these have prompted the governments of developed as well as the emerging economies such as India, Indonesia and Brazil. to reformulate their economic policies around the basic principles of greater emphasis on market mechanisms (less government intervention) and a stable macroeconomic framework.

In light of the discussion above, it is no surprise that governments have set the following as goals of macroeconomic policy:

- Sustained income growth.
- Low unemployment.
- Mild fluctuations.
- Price stability.
- Exchange rate stability.
- Balance of trade surplus.

Measuring economic performance: Output and income

The output of "the economy", a particular nation's productive capacity, exclusive of unpaid work consists of millions of different goods. We could report how much of each good the economy produced: 1,400,362 computers, 1,650,562,382 metres of fibre-optic cable, 13,220,490 bottles of beer, and so forth. Such data may be useful for some purposes, but they do not provide us with the information we want. If next year the output of computers falls by 10 per cent, the output of cable goes down by 2 per cent, and the output of beer rises by 3 per cent, has total output gone up or down? And by how much?

We need a single number that summarises these outputs of the economy. But how do we add up the computers, cable, beer and millions of other products produced in the economy? We do this by adding the money value of all the final goods and services produced (those that are not used to make other goods and services) to arrive at a single number that encapsulates the production of the economy.

The most common measures of production of an economy are Gross Domestic Product (GDP) and Gross National Product or income (GNP). GDP and GNP refer to production during a particular time period, which we usually take to be a year or a quarter of a year. They are the flow of new products during the year (or the quarter) and are measured in the currency of the local economy.

GDP versus GNP

GDP is total income earned within the country. It includes income earned domestically by foreigners, but it excludes income earned by domestic residents on foreign ground. This total value of goods produced would also measure the total value of domestic residents' (nationals') incomes, but only if

1. No domestic worker had a job in another country.
2. No foreigner had a job in theur domestic economy.
3. All machines and factories used were owned by domestic residents or nationals (residents of a nation).

However, since some income is received from individuals owning capital equipment in other countries, GDP is not a perfect measure of total domestic income. Thus, statisticians also compute an alternative measure, the *gross national product* (GNP). GNP is total income earned by nationals. It includes the income that nationals earn abroad but it does not include the income earned within a country by foreigners. The difference between GDP and GNP is, therefore, known as "net investment income from non-residents".

Most countries pay more attention to GDP than to GNP for measuring their aggregate economies. For the purpose of *stabilising employment*, we are interested in a broad measure of job-creating within the nation. GDP is that measure. For evaluating trends in the *standard of living* of many nations, including the OECD (Organization for Economic Cooperation and Development) nations, GNP is more appropriate. Despite a possible gap between GDP and GNP, possibly arising from either foreigners owning some capital equipment operating within the nation or nationals being in debt to foreigners, we simplify by ignoring the difference between them (and focus only on GDP) within this course.

There are three different ways to think about and measure GDP. Statisticians can measure either:

1. The production of each industry agriculture, mining, manufacturing, etc.
2. The income that this production generates wages, salaries, profits, etc.
3. The expenditure on the goods and services produced spending by households, firms, governments, etc.

To see how GDP can measure all these things at once, we must discuss national accounting, the accounting system used to measure GDP and many related statistics.

Study skills

If a Malaysian company in Brazil employs a Malaysian citizen, the income that he/she earns is:

A. Part of Malaysian GDP and Brazil's GNP.

B. Part of Malaysian GDP and Brazil's GDP.

C. Part of Malaysian GNP and Brazil's GNP.

D. Part of Malaysian GNP and Brazil's GDP.

Solution:

D. Since it is income by a Malaysian national abroad, it is part of the Malaysian GNP. However, since she contributes via a Malaysian firm (a foreign firm to Brazil), it is also part of Brazil's domestic production, GDP.

Income, expenditure and the circular flow

Imagine an economy that produces single good, bread, from a single input, labour. **Figure 3.1** illustrates all the economic transactions that occur between households and firms in this economy.

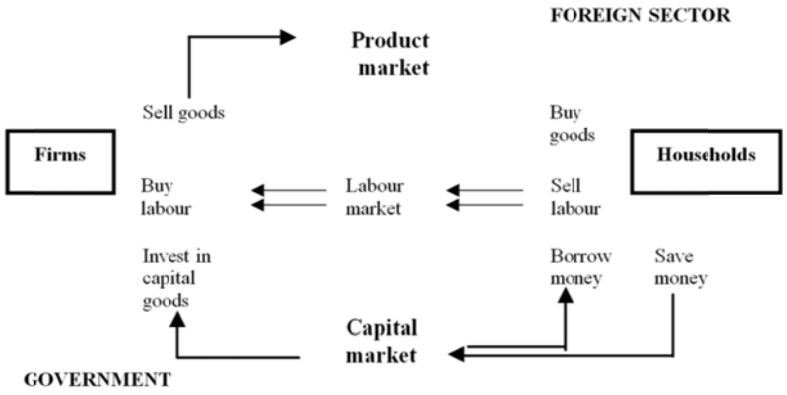


Figure 3.1 An economy producing a single good with a single input

This figure illustrates the flows between firms and households in an economy that produces one good or product, bread, from one input, labour. The inner loop represents the flows of firms selling the bread they produce to households. The outer loop represents the corresponding flows of money: households pay the firms for the bread, and the firms pay wages and profit to the households. In this economy, GDP is both the total expenditure on bread and the total income from the production of bread.

Value added and intermediate goods

Several difficulties arise when output is measured. Let us explore two of them. Suppose a farmer produces $5 worth of wheat, which he sells to a baker. The baker exerts $20 worth of effort to turn the wheat into bread, which she sells for $25. At the end of the day, what has been produced? The answer is just $25 worth of bread. But if we ask the farmer and the baker to report their output for the day, the farmer says, “I produced $5 worth of wheat,” and the baker says, “I produced $25 worth of bread."

A statistician who naively adds these numbers might think that there has been $30 of output in the economy. The statistician is led astray by counting the wheat, which is not a *final* good but rather an *intermediate* good that disappears after it is used to produce the bread. There are two ways to avoid this measurement pitfall:

1. Ask the farmer and the baker to report the value of their sales of *final* goods to consumers. The baker reports $25 and the farmer reports $0 because his wheat is not a final good.
2. Ask the farmer and the baker to report the *contribution* of each made to the total. The farmer reports $5 worth of wheat and the baker reports $20 worth of effort, for a total value of $25 worth of output.

We call the baker’s contribution to output his/her *value added*, which the baker calculates by subtracting his/her costs, $5, from his/her revenue, $25. The baker’s value added is thus $20. The farmer’s value added is $5: in our example, the farmer had no costs. When businesses report their output to the government, they subtract their costs, so they are reporting value added. The government then sums the value added by all businesses to arrive at GDP.

There are many examples of intermediate goods e.g., wheat whose value should not be double-counted when output is computed. Other examples are oil, shipping and advertising.

For businesses to know what to report as their contributions or value added, they have to know how much of their costs they should subtract from their revenues. Thus, the government must define “intermediate goods” quite explicitly. Officially, an intermediate good or service is one that is used up in the production of other goods or services during the same period in which it was produced. The key phrases in this definition are “used up” and “same period”. Let us see how these concepts clarify which goods are intermediate and which are final.

Study skills

A farmer who grows barley sells some of it for $1 to a miller. The miller turns the barley into flour and then sells the flour to a baker for $3. The baker uses the flour to make bread that he sells for $5 to an economist, who eats the bread. What is the value added by each person? What is GDP?

Solution:

The farmer's value added is $1.00, as she starts from scratch. The miller's contribution (value added) is ($3.00 -$1.00 = $2.00). The baker's contribution is ($5.00 - $3.00 = $2.00). The value of GDP is the sum of the values added ($1.00 + $2.00 + $2.00 = $5.00), which is equal the value of the **final product (bread).**

Several measures of income

The national accounts include other measures of income that differ slightly in definition from GDP and GNP, and economists and the press often refer to them. You can see how the alternative measures of income relate to one another by starting with GDP and subtracting various quantities. First, to obtain GNP from GDP, we subtract the net income of foreigners who own factors of production employed ina country:

GNP = GDP − Net Income of Foreigners.

GDP and GNP are *gross* measures of an economy because of the *gross investment* firms' make on new capital and additions to inventories. The capital stock increases because of investment and decreases because of depreciation. The total additions to the capital stock in a given period are called gross investment. The change in the capital stock equals gross investment minus depreciation and is called *net investment*. To obtain net national product (NNP), we subtract the depreciation of capital,that is the amount of the economy's stock of plant, equipment and residential structures that wear out during the year:

NNP = GNP − Depreciation.

In the national accounts, depreciation is called the *capital consumption allowances*. Since the depreciation of capital is a cost in producing the output of the economy, subtracting depreciation shows the net result. For this reason, some economists believe that NNP is a better measure of economic well-being.

The next adjustment in the national accounts is for indirect business taxes such as sales taxes and subsidies. These taxes place a wedge between the price that consumers pay for a good and the price that firms receive. Because firms never receive this tax wedge, it is not part of their income. Once we subtract indirect business taxes from NNP, we obtain a measure called *national income*:

National Income = NNP − Indirect Business Taxes.

National income is a measure of how much everyone in the economy has earned.

GDP data are, in practice, used not only as a measure of how much is being produced but also as a measure of the welfare of the residents of a

country. Economists and politicians talk as if an increase in real GDP means that people are better off. In reality, GDP data are far from perfect. Most of the *difficulties of' measuring* GDP arise because some outputs do not go through the market. Examples are volunteer activities, housework, and do-it-yourself home improvements. In the case of the government sector, we already noted that production is valued at cost. This is because much of government output is not sold in the market, nor is there a simple technique available that would make it possible to estimate the value of government output. How would we measure safety from criminals as the value of output that police expenditures are supposed to produce?

Potential GDP

You saw that GDP measures how much the economy actually produces. But the economy is generally capable of producing more than it actually does. Another measure, *potential* GDP, indicates what the economy could produce if labour and machines were fully used up. Although it is true that actual GDP usually falls short of its potential, sometimes it could exceed it. This happens when the rate of utilisation of the labour force and that of other factors of production exceeds their normal rates. Strong upward fluctuations are called *boom*, and downwards ones are called *recessions*. Severe downturns are referred to as *depressions*. The last depression, called the *Great Depression* because of its length and depth, began in 1929. The economy did not fully recover from it until four years later. There is no technical definition for a boom, but there is one for a recession; a recession is said to have occurred when GDP falls for at least two consecutive quarters.

The economy's fluctuations are sometimes called *business cycles* but the term "cycle" suggests a kind of regularity that cannot be found between one downturn and the next. Economists have seen patterns repeat often enough to have given a name to the bottom of a recession (a *trough*) and the top of a boom (a *peak*). However, we also know that as little as two years and as much as ten can elapse between one and the other.

Study skills

Net national product (NNP) is equal to

A. GDP minus consumption of fixed capital.
B. GNP minus consumption of fixed capital.
C. Personal disposable income plus net interest payments.
D. Personal income plus net interest payments.

Solution:

B. The difference between gross and net is what is known as personal consumption allowances or depreciation. NNP is obtained from GNP not GDP.

Real versus nominal GDP

Both GDP and GNP, as discussed above, are valued at *market prices*, the prices paid by the final user. There is, however, one problem with using money as a measure of output: the value of one dollar changes over time.

Chocolate bars, books, movie tickets and cars cost more today than they did ten years ago, whereas computers cost less. We use prices not only because they are a convenient way of making comparisons but also because prices reflect how consumers value different goods. If the price of an orange is twice that of an apple, it means an orange is worth twice as much at the margin as an apple. Another way of saying this is that one dollar does not buy as much as it did ten years ago. We do not want to be misled into believing that the output is higher when in fact only the price level has risen. To keep the comparisons of different years straight, economists adjust GDP for changes in the average level of prices. Unadjusted GDP is known as *nominal* GDP (RMY_t). The term *real* GDP (Y_t) is used for inflation-adjusted GDP figures, which are true year-to-year measurements of what the economy actually produces. To calculate real GDP, economists take the nominal value of GDP, the money value of all the goods and services produced in the economy and divide it by a measure of the price level. Thus, real GDP is defined by the equation:

Real GDP = Nominal GDP/ Price level

If, for instance, nominal GDP has risen 5 per cent in the past year but prices have also increased by 5 per cent, then real GDP is unchanged. If nominal GDP has risen 5 per cent in the past year but prices have increased by 6 per cent, real GDP has actually decreased.

Phases of the business cycle

Business cycles reflect the fluctuations in the growth of real GDP. A **business cycle** is the periodic but irregular up-and-down behaviour of total production and other measures of an economy. Business cycles have four phases, namely: expansion, peak, recession, and trough. The expansion phase is the period during which real GDP is increasing. A peak is the highest level of real GDP yet attained. A peak is a turning point between an expansion and a recession. After achieving a peak, real GDP usually turns into recession, that is, a period during which real GDP decreases for at least six months. Finally, a trough is the temporary low-point in real GDP and it is a turning point between a recession and an expansion.

Study skills

Suppose nominal GDP increased by 5 per cent in 2001 (over its previous year). Given this information, we know that:

A. The aggregate price level (the GDP deflator) increased in year 2001.

B. Real GDP increases in year 2001.

C. Both the aggregate price level and real GDP rose in year 2001.

D. More information is necessary to answer this question.

Solution:

D. Nominal GDP is equal to real GDP multiplied by price. Therefore, it is not clear from the available information which of the two elements of nominal GDP is behind the 5% change, or whether perhaps both are.

Price indexes and inflation

In macroeconomics, the price level is the average level of prices measured by a *price index*. For example, in Canada, two main price indexes that are used today are the Consumer Price Index and the GDP Deflator.

The consumer price index (CPI)

The CPI is a measure of the price level that considers the price of a list of specific goods and services purchased by a typical household at current prices. The nation's statistics agency typically starts with this "basket" of purchases and calculates this year's CPI by expressing the cost of the basket in the current year as a percentage of the cost of that same basket in the base year. The CPI is the weighted average of price movements of several thousand goods and services grouped into several hundred categories. More precisely:

$$\text{CPI} = \frac{\text{value of fixed basket in current prices}}{\text{value of fixed basket at base year prices}} \times 100$$

where the value of the basket represents total expenditure on (or the cost of) the basket in any period, month or year. The base year is an arbitrary year employed by the nation's statistics agency that, depending on the agency's approach, its targets and its feasibility, normally changes once every five to ten years.

Implicit GDP deflator

Economists generally tend to prefer measures of the inflation rate that are broader than the CPI. The broadest such measure is the *implicit GDP deflator* (sometimes called just the *GDP deflator* for short). The GDP deflator is an average of the prices of all goods in the economy, weighted by the quantities of those goods that are actually purchased. The computation of the price deflator is simple. It is equal to nominal GDP as a percentage of real GDP (expressed in the currency of the base year):

$$\text{GDP deflator} = \frac{\text{Nominal GDP}}{\text{Real DGP}} \times 100$$

The deflator, then, is highly inclusive. Another main difference between the CPI and the deflator is that the CPI is a fixed-basket index whereas the deflator is a variable-basket index.

Expressed in terms of a time period, the GDP deflator in year t (P_t) is defined as the ratio of nominal GDP to real GDP in year t: $Pt = \text{RM}Y_t/Y_t$. The GDP deflator gives the average price of all goods and services included in GDP.

Both the GDP deflator and the CPI can be used to calculate the inflation rate.

Inflation rate

The percentage of change in the price level is called the *inflation rate*. If the price level rises from $20 per good to $22 per good over a period, the inflation rate for the period is 10 per cent. If the price level falls from $20 per good to $18 per good, the inflation rate is -10 per cent; that is, there is a 10 per cent deflation. The measure of inflation most frequently cited by the media is the CPI:

$$\text{Inflation rate} = \frac{CPI_t - CPI_{t-1}}{CPI_{t-1}} \times 100$$

An alternative rate of inflation can be calculated by replacing the CPI with the deflator.

Study skills

1. From the data given in the table below, compute Northton's nominal and real GDP for the current year, its CPI, and its rate of inflation from the base year.

Data from Northton				
	Price		Quantity	
Item	Base	Current	Base	Current
Rubber ducks	**1.00**	**1.25**	**100**	**100**
Beach towels	**9.00**	**6.00**	**12**	**14**

2. Use the following information to:
   A. Calculate the rate of inflation between 1997 and 2001.
   B. Calculate the rate of inflation between 1998 and 1999.
   C. Calculate the rate of inflation between 2000 and 2001.

GDP deflator

1997	100.0
1998	101.7
1999	102.4
2000	105.0
2001	107.1

Solutions:

1. Nominal GDP is equal to Price x Quantity. For the current year, it is (100 x $1.25 + 14 x $6.00 = $209). Real GDP is (100 x $1.00 + 14 x $9.00 = $226). The CPI is calculated by dividing the current outlay on a fixed basket by the outlay on the same basket in the base year:

   CPI = (100 x $1.25 + 12 x $6.00)/(100 x $1.00 + 12 x $9.00) = 197/208 = .947 (or 94.7 as the CPI should be multiplied by 100).

Inflation rate is [(94.7 – 100)/ 100] x 100 = 5.3%. Remember that the CPI for the base year is, by convention, equal to 100.

2. A. 7.1%. You can do this simply by taking the difference between the base year price index (100) and the price index in 2001 (107.1 -100) x 100).

   B. This and the next part cannot be found as readily as the first part of the question. Inflation in 1999 is [(102.4 - 101.7)/101.7] x 100 = .688%.

   C. [(107.1 -105)/105] x 100 = 2%

Unemployment statistics

In most countries, unemployment data are collected by their respective statistics agencies, which survey a representative mix of households and ask each whether a member of the household is currently seeking employment. The unemployment rate is the ratio of the number seeking employment to the total *labour force*:

$$\text{Unemployment rate} = \frac{\text{Number of unemployed}}{\text{Labour force}} \times 100$$

$$\text{Labour force} = \text{Number employed} + \text{Number unemployed}$$

Problems with unemployment statistics

Some economists believe that the statistics agencies' unemployment surveys provide too high an estimate of the true unemployment rate. These statistics typically come from the labour force survey conducted by the agency in charge. Based on the survey questions, each working age individual is placed into one of three categories: employed, unemployed and not in the labour force. The main difference between an unemployed individual and one who is not in the labour force is that the latter is deemed not actively looking for a job. Some workers who do not have jobs may have in fact abandoned hope of finding one. They are referred to as *discouraged workers*. Statistics will not count them as unemployed, thus will provide an underestimate of the number that would choose to work if a job were available.

The sharp focus on the unemployment rate by economists, policy makers and the media is, to a degree, misguided. As discussed above, some of those classified as not in the labour force are in fact discouraged workers. These workers would typically take a job if offered it even though they are not looking for one. This is why economists sometimes focus on the *employment rate*. Employment rate is the ratio of employment to working age (*adult*) *population*:

$$\text{Employment rate} = \frac{\text{Number of employed}}{\text{Adult population}} \times 100$$

Finally, the fraction of the working age population that is employed or seeking employment is called the *labour force participation rate*, which is the ratio of labour force to population. Because of discouraged workers, the labour force participation tends to decline in recessions:

$$\text{Participation rate} = \frac{\text{Labour force}}{\text{Adult population}} \times 100$$

Study skills

Use the information provided below to answer the following questions.

Civilian population	30 million
Employed	15 million
Unemployed	1.5 million

A. What is the size of the labour force?

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

C. Calculate the unemployment rate.

Solution:

A. Labour force = employed + unemployed = 15 = 1.5 = 16.5 million.

B. 30- 15.5 = 14.5 million are out of labour force for a variety of reasons.

C. 1.5/ 16.5 = .909 or 9.09%.

Aggregate Demand, Aggregate Supply and Economic Fluctuation

Introduction

Describing the regular patterns that economies experience as they fluctuate over time is easy. Explaining what causes these fluctuations is more difficult. Indeed, compared with the topics you have studied up to now, the theory of economic fluctuations remains controversial. This section develops a model that most economists use to explain short-run fluctuations in economies.

Most business decisions are short-run determinations and most are made under conditions of uncertainty. These uncertainties typically reflect short-term fluctuations in economic demand in response to the impact of the *business cycle*. These fluctuations, in turn, represent the reaction of the most basic economic decision makers – households and businesses – to the economic conditions that prevail at a particular time.

This section describes changes in economic forces that result in fluctuations in economic and business activities, in both the short and long run. You must have realised that it is not possible for managers to anticipate the exact behaviour of the economy all the time, nor do most managers need to track fluctuations scientifically. Specialists can do this. However, a competent manager should not only be aware of the effects of the short-term economic fluctuations on her business but also be sensitive to current economic conditions.

For example, suppose a manager, say of a chain of upscale department stores, is to order its line of summer designer clothing several months ahead of time. Since the demand for the dresses will be affected by the economic conditions prevalent at that future time, it is necessary for the manager to foresee those economic conditions. Naturally, the manager should combine the forecasted future conditions with prevailing economic conditions. Two points emerge:

1. The manager needs to be proactive.
2. The future is uncertain and forecasts are not always accurate.

Should the manager expect a buoyant economy and instead it weakens, the stores will be stuck with expensive dresses they cannot sell. On the contrary, if she looks for a lacklustre economy and, in fact, it grows strongly, the stores will miss out on sales that could have been made. Thus, misjudging the economy's strength can prove to be a costly error. However, while managers are not to be blamed for economic misforecasts, which are normally done by a third party, to avoid unpredictable consequences they should take measures to avoid all-or-nothing strategies.

From a policy point of view, economic forces that affect the demand and supply of goods and services as well as labour also affect the demand and supply of credit. Such changes in turn will set influence the central bank's monetary policy as central bankers respond to those situations. Again, while firms and households cannot prevent certain policy measures from being taken by authorities, they should be prepared to revise their decisions accordingly.

Study skills

1. The business cycle describes
   - A. the change in the standard of living across countries.
   - B. the change in potential GDP over time.
   - C. the behaviour of real GDP over time.
   - D. the behaviour of GNP over time.

2. The business cycle is defined as
   - A. the period of time during which the unemployment rate is rising.
   - B. the period of time during which the inflation rate is rising.
   - C. persistent growth in potential GDP.
   - D. irregular ups and downs in production and jobs.

Solutions:

Discuss your answers with your tutor.

Aggregate demand and its components

What is the connection between price, GDP, levels of spending and real output in an economy? In the case of individual markets, the explanation can be given in terms of demand and supply. First, we will look at how the concept of demand can be applied to the economy as a whole to see the relationship between the general price level and total spending in the economy, which is known as *aggregate demand* (AD).

Remember that total spending on an economy's goods and services is the sum of four components: consumption, investment, government purchases and net exports. The primary groups responsible for this spending are households, businesses, governments and foreigners. Total spending in an economy, adjusted for changes in the general price level, is referred to as *real expenditures* and is calculated with the use of the GDP price deflator.

The aggregate demand curve

Aggregate demand can be expressed in a table known as the *aggregate demand schedule* or on a graph known as the *aggregate demand curve* (AD). **Figure 3.2** and **Table 3.1** show an aggregate demand schedule and an aggregate demand curve.

Real GDP Demanded (Billions of dollars)	Price Level
520	100
440	110
360	120
280	130
200	140
120	150
40	160

Table 3.1

As indicated in **Table 3.1**, output demanded and the price levels are inversely related.

Price and quantity demanded of a single product have an inverse relationship: as price rises, quantity demanded decreases, and vice versa. The same can be said for general price levels and real aggregate expenditures although for different reasons. The quantity demanded of a certain product can be explained by the price of that product but the story

is different for the aggregate output. As the general level of prices increases, less real output is bought for three reasons:

1. The real value of financial assets such as bank accounts and bonds, decreases – the *wealth effect*. As a result, households feel less wealthy so they reduce their consumption spending.
2. Net export spending decreases as foreigners spend less on domestic exports – *real exchange rate effect*.
3. To these reasons, one can add the less-intuitively obvious channel of interest rates. A rise in the price level tends to lower the rate of interest that in turn tends to encourage investment spending – the *interest rate effect*.

Just as with a demand curve for a single product, the price variable is placed on the vertical axis of the graph, and the output variable is placed on the horizontal axis.

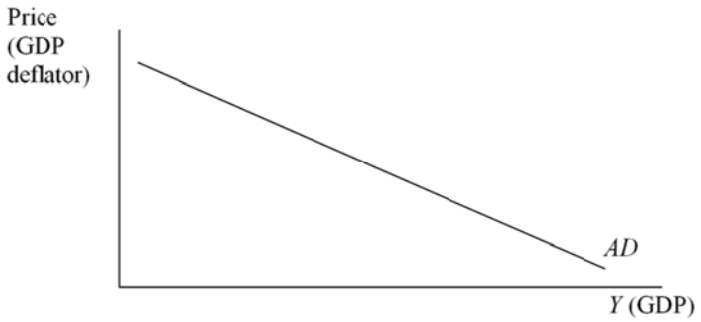


Figure 3.2

As discussed in Module 1, this relationship can be represented by a key equation as follows:

$$Y\,(GDP) = C + I + G + (X - M) \qquad (1)$$

This relationship represents aggregate demand: the sum of personal consumption expenditures, C, residential investment plus businesses (nonresidential) investment, I, government expenditures, G, and net foreign expenditures or net exports, $(X - M)$, which is exports minus imports, on the goods and services produced in the economy.

Consumption consists of purchases of non-durable goods such as food and fuel; consumer durable goods such as cars and services such as travel and banking.

Investment consists of additions to capital stock or real capital formation – not to be confused with financial investment. There are three elements contained in investment:

1. machinery and equipment investment
2. residential and office investment
3. additions to inventories.

Government spending consists of current spending (on goods and services) such as health and education. Note that part of government spending belongs to consumption and the other part to the investment category. For example, government spending on infrastructure such as roads belongs in the investment category, whereas spending on services such as civil servants' salaries, belongs in the consumption category. However, spending on education and research and development, which are to be regarded as investment, are curiously treated as current (consumption) spending.

Exports comprise spending by foreigners on domestically produced goods and services and are therefore added to aggregate demand (included in GDP). Imports are, of course, the opposite: domestic spending on foreign-produced goods and services. They are therefore subtracted (excluded) from aggregate demand.

Changes in aggregate demand

There are other factors besides the price level that can influence total spending. However, these factors (*aggregate demand factors*) change total spending at all price levels. In other words, they shift the aggregate demand curve.

When factors other than price level affect any of these components, they, in turn, affect the entire real expenditures (demand) schedule and hence cause the aggregate demand curve to shift.

Suppose, for example, that due to an increase in government purchases, the aggregate demand curve shifts to the right, as shown in **Figure 3.3**, from AD_1 to AD_2. This change is known as an *increase* in aggregate demand. Similarly, a *decrease* in another component of real expenditures, such as exports, causes a decrease in total expenditures. This decrease in aggregate demand is represented by a shift in the aggregate demand curve to the left, AD_3. Aggregate demand factors can be categorised by the spending component they immediately affect. As we consider each in turn, we must assume that all other aggregate demand factors and the price level remain constant.

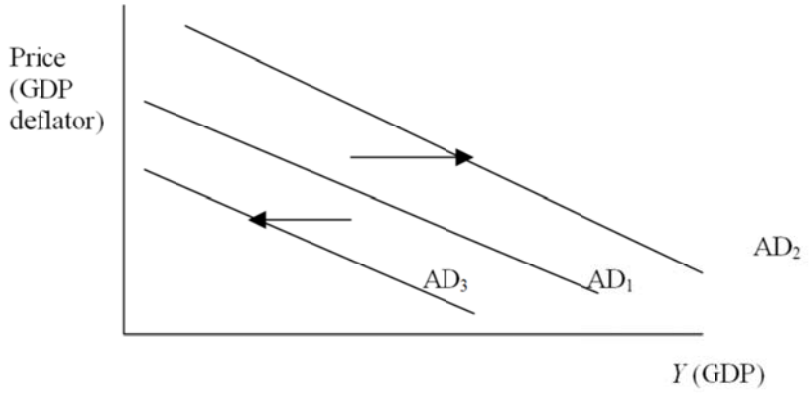


Figure 3.3

Consumption and its determinants

Personal consumption expenditure, or simply consumption, is the component of aggregate demand that represents spending by households on goods and services. Consumption spending constitutes the largest component of economies, accounting for a bit more than two-thirds of GDP of Canada, for example.

A key notion in all of macroeconomics views consumption as the core of aggregate demand. The other components, in one sense or another, facilitate consumption. Business investment spending ultimately provides the capacity to produce consumer goods.

Exports are produced to exchange for imported consumer goods. (Although this may not be the intention of the exporters, it is still true in the end). It can even be argued that government spending ensures an environment within which "the pursuit of happiness" can take place.

One of the most basic relationships in economics is that between income and consumer spending. In *The General Theory of Employment, Interest, and Money*, the basis for modern macroeconomics, John Maynard Keynes noted:

1. Consumer spending tends to increase as income increases.
2. The increases in spending are less than the full increase in income (some of the increased income is saved).

These two aspects of the aggregate income-spending relationship are presented in Equation (2) and **Figures 3.4**. **Figure 3.4** contrasts real personal consumption expenditures (C) with real disposable income (income after taxes). Real disposable income (YD) equals real GDP (Y) minus taxes (T).

$$C = a + b\,(Y - T) \qquad (2)$$

Since figures for 1960 became available, data inspection confirms the following relationship for a country such as Canada:

$$C = 0.54 + 0.85\ YD \qquad (3)$$

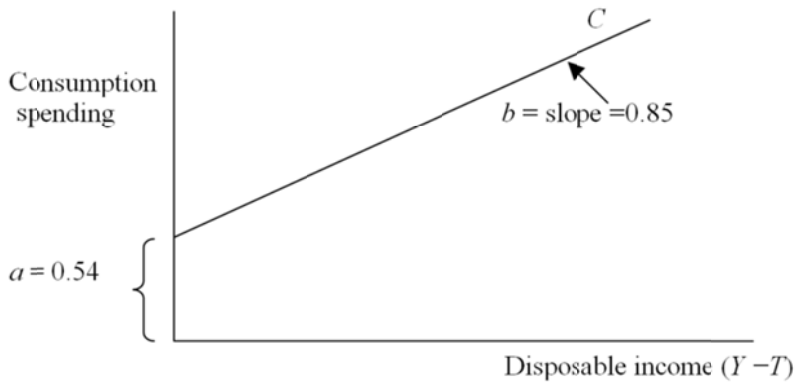


Figure 3.4

This result indicates that for every $1 increase in after-tax income, individuals spend 85 cents (saving the remaining 15 cents). One can confidently state that the equation (2) is a quite accurate description of the real world's consumption-income relationship. A comparison between the generic equation (2) and the estimated equation (3) suggests that $a = 0.54$, the vertical intercept, and b, the slope of the function, equals 0.85.

Personal consumption and saving are two uses of disposable income. Thus, consumer spending is decided when households determine how much to spend or save. The constant term, 0.54, is unimportant. It does, however, highlight the fact that changes in factors other than disposable income, discussed below, affect the position of the curve, whereas *changes arising from GDP (Y) and hence YD disposable income cause movement along the curve*. Conventionally, *b* is referred to as *marginal propensity to consume* (MPC), which is defined as the change in *C* brought about by a given change in *YD*

Marginal Propensity to Consume (MPC)

The **Marginal Propensity to Consume** (**MPC**) is the fraction of a change in disposable income (Y_d) that is spent on consumption (C). In other words, MPC is also defined as the additional consumption spending generated by an additional amount of disposable income, and the value of MPC is assumed to take a value less than unity. MPC can be calculated as follows:

$$\text{MPC} = \frac{\text{Change in consumption}}{\text{Change in disposable income}} = \frac{\Delta C}{\Delta Y_d} < 1$$

Marginal Propensity to Save (MPS)

An alternative to spending is saving by households. Saving (S) is the amount of disposable income that households do not spend on the consumption of goods and services. The marginal propensity (MPS) is defined as the additional household saving generated by an additional amount of disposable income.

$$\text{MPS} = \frac{\text{Change in saving}}{\text{Change in disposable income}} = \frac{\Delta S}{\Delta Y_d} < 1$$

Hence, the marginal propensity to consume (MPC) plus the marginal propensity to save (MPS) for any people will equal to one, namely *MPC + MPS = 1*.

For example, if a $40,000 increase in income stimulates consumption spending by $32,000. Then, the marginal propensity to consume is 0.80.

$$\text{MPC} = \frac{\Delta C}{\Delta Y_d} = \frac{32{,}000}{40{,}000} = 0.80$$

Since MPC + MPS = 1, then MPS = 1 - 0.80 = 0.20.

This suggests that for every additional $1 in disposable income, consumers will consume $0.80 of their additional disposable income and will save $0.20.

Study skills

1. When a consumer realises extra income in a household and spends the extra income, it is called the:
   A. Average propensity to save.
   B. Marginal propensity to consume.
   C. Average propensity to consume.
   D. Marginal propensity to save.

2. The marginal propensity to save is:
   A. Consumption divided by real disposable income.
   B. Saving divided by real disposable income.
   C. The change in saving divided by the change in real disposable income.
   D. The change in consumption divided by the change in real disposable income.

Solutions:

Discuss your answers with your tutor.

Study skills

Assuming that taxes (*T*) are 25 per cent of national income, (*T* = 0.25*Y*), and MPC is 0.85, calculate the increase in *T*, *C* and *S* (saving) if *Y* increases by $1.

Solution:

For every $1 increase in Y (GDP), there is an increase of 75 cents in real disposable income—25 cents taken away as taxes. Of 75 cents, 85% goes to consumption (MPC = 0.85), which is about 63.7 cents (0.85 x 75 cents) and the remaining, 25%, goes to personal saving, which is 21.3 cents (.25 x 75).

Disposable income

The most significant determinant of consumer spending is the level of disposable income (*YD*). The economy's total disposable income may change as a result of changes in population or changes in disposable income per household. Higher income taxes, for example, decrease household disposable income and hence consumer spending. As a result, aggregate expenditures drop, shifting the aggregate demand curve to the left.

Wealth

Wealth and income are quite different. Income consists of earnings received over time, wealth is made of financial and real assets. Real assets (such as houses and appliances) and financial assets (such as stocks and bonds) are measured at a particular time. We have already considered the wealth effect – the effect of the price level on the real value of wealth, which then influences consumer spending. Factors other than price level can also affect wealth and, in turn, consumer spending. For example, if stock prices jump, households who own stocks enjoy increased wealth. As a result, these households will probably spend more of their disposable income. Aggregate demand will increase, and the aggregate demand curve will shift to the right. Conversely, an increase in consumer debt means that households lose wealth. Households reduce spending as a result – aggregate demand decreases.

Consumer expectations

Consumer expectations influence the demand for a single product. Similarly, these expectations can affect aggregate demand by changing general consumption patterns.

If consumers expect prices to rise – for example, because of a natural disaster, or a war – they will spend more now and save less. As a result of higher consumer spending, aggregate demand increases and the aggregate demand curve shifts to the right. Likewise, if consumers expect their incomes to rise soon, they again spend more and save less. Aggregate demand increases.

Interest rates

Because households often borrow to purchase durable goods such as cars and furniture, changes in real interest rates can affect their purchasing decisions. If the real interest rate falls, consumers are more likely to borrow in order to buy big-ticket items. Therefore, consumer spending

rises and the aggregate demand curve shifts to the right. Conversely, a jump in the real interest rate has the opposite effect because consumer spending falls, aggregate demand decreases, and the aggregate demand curve shifts to the left.

As a conclusion, changes in wealth (not triggered by price changes), expectations and interest rates cause a *shift* in the AD curve whereas changes in price cause a *movement along* the curve.

Investment and its determinants

As discussed earlier, investment within GDP comprises three major components: residential construction, non-residential fixed investment and change in business inventories. These are widely varied in terms of the decision makers, the types of spending and the influences that affect the decision-making process. Moreover, evidence suggests that these spending components are highly cyclical. In fact, they represent the most cyclically sensitive components of aggregate demand.

Non-residential fixed investment is the most conventional form of investment spending. It is about business managers making decisions to spend to increase a firm's capacity for producing other goods or to cut spending in order to contract capacity. Although residential construction is consumer spending, a house is different from other types of consumer spending in that it is such a major expenditure and such a long-lived asset that it is considered investment in capital rather than merely a purchase to be consumed in the near term. The change in business inventories is a necessary expenditure to carry on business.

Business managers increase or decrease their holdings of inventories in anticipation of an economic expansion or contraction, respectively.

Nonresidential fixed investment

Investment represents spending on projects where earning a profit is anticipated. The investment component of aggregate demand is limited to planned investment, which excludes unintended changes in inventories.

As already suggested, non-residential fixed investment conforms to the commonly held notion of investment. It consists of spending for structures (plants, office buildings and commercial buildings) and for equipment: industrial machinery, office machinery (from computers to desks to pencil sharpeners), transportation equipment (cars, trucks, ships, and aircraft), and tools. These represent the capital goods used to produce goods. Capital goods are factors of production that are purchased with a large outlay *up front* but that yield a stream of income over an extended period.

The usual textbook discussion of investment refers to an inverse relationship between investment and interest rates. The typical argument holds that interest rates represent the opportunity cost (foregone rate of return) of tying down money in a specific investment project. The higher

interest rates are, the higher the foregone alternative (opportunity costs) and the lower the desire to invest in that project.

Alternatively, the impact of interest rates on investments is viewed from the perspective f costs of borrowing. Clearly, rising borrowing costs tend to discourage investment.

However, the relationship between investment and interest rates is far more complex. It is not the level of interest rates alone that determines investment but rather the level of interest rates relative to the rate of expected return on investment, with the interest rate being viewed as a benchmark. This gives substance to an important behavioural characteristic: businesses invest in increased plant and equipment only if they can envision increased profits as a result. Investments are not made simply because interest rates are low.

Residential construction

Many factors influence investment in residential construction. Intuitively, you would put interest rates high on the list and you would be right. Other important influences are income prospects and employment conditions. Clearly, favourable to the housing markets are market conditions that are characterised by low and falling interest rates as well as a business cycle that is in an upswing. The higher the interest rate is, the greater the cost of carrying a mortgage. A $100,000 mortgage costs $8,000 per year if the interest rate is 8 per cent but $10,000 per year if the interest rate is 10 per cent. As the interest rate rises, the cost of owning a home rises and the demand for new homes falls. An improvement in the general health of the economy causes the demand for housing to rise.

Change in business inventories

Business investment is not restricted to spending on *fixed* capital-structures and equipment but also includes stocks of raw materials, goods still in production and finished goods ready for sale. These inventories are held by manufacturers, wholesalers, retailers, and farmers and represent the businesses they need to carry out such as bricks, mortar and tools.

Inventory management is a vital concern to business managers who determine the inflow to inventories. Because the inventories have to be paid for and financed until they can be sold, their buying has a profound effect on the company's costs.

Part of these costs is the carrying cost of inventories that is influenced by the level of interest rates. If interest rates are high and expected to rise, the cost of carrying inventories, given the level of sales, tends to rise and the firm will want to reduce its inventory level. Managers must also pay attention to current sales trends in coordinating their buying (ordering) of products for future sale. Investment in inventories is related to the retailers' *sales expectation*, which in turn is related to present sales trends. If sales have been strong, then sales in the near future probably will continue to be strong, and inventories will be increased. If sales have been

faltering, a firm will probably wish to curtail future orders, relying on existing inventories to meet future sales.

Therefore, the behaviour of investment in inventories can be summarised as follows: it rises as the expected sales increase but falls as interest rates increase.

This discussion can be summarised with an equation relating investment I, sum of all of its components, to the real interest rate r:

$$I = I(r) \qquad (4)$$

Figure 3.5 shows this investment function. It slopes downward, because as the interest rate rises, the quantity of investment demanded falls.

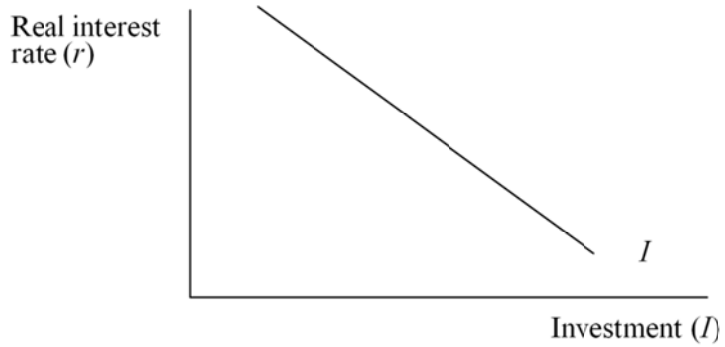


Figure 3.5

When studying the role of interest rates in the economy, economists distinguish between the nominal interest rate and the real interest rate. This distinction is relevant when the overall level of prices is changing. The *nominal* (or market) *interest rate* is the interest rate that is usually reported in the financial press: it is the rate of interest the investors pay to borrow money. The *real interest rate* is the nominal interest rate corrected for the effects of inflation. A full discussion of the relationship between the real and nominal interest rates is postponed until Module 4. At this stage, it is sufficient to know that investors' decision to invest or not, and how much, is sensitive to the inflation-adjusted (real rate) cost of borrowing.

Investment demand curve

A drop in interest rates increases investment and hence aggregate demand, giving rise to a shift in the aggregate demand curve to the right, whereas an increase in interest rates does the opposite. A change in business expectations, either optimistic or pessimistic, can affect the position of the investment demand curve. If businesses anticipate that profits will increase, the investment demand curve shifts to the right, causing an increase in aggregate demand. Conversely, if businesses anticipate that profits will drop, the investment demand curve shifts to the left, leading to a decrease in aggregate demand.

Government purchases

Government purchases are the third component of the demand for goods and services. The government buys helicopters, computers and the services of government employees. It buys library books, builds schools and hospitals, and hires teachers and doctors.

These purchases are only one type of government spending. The other type is transfer payments to households such as welfare for the poor and the government pension payments for the elderly. Unlike government purchases, transfer payments are not made in exchange for some of the economy's output of goods and services. Therefore, they are not included in the variable *G*. Transfer payments, however, do affect the demand for goods and services indirectly. Transfer payments are the opposite of taxes: they increase households' disposable income just as taxes reduce disposable income. Thus, an increase in transfer payments financed by an increase in taxes leaves disposable income unchanged. We can now revise our definition of *T to equal taxes minus transfer payments*. Disposable income, $Y - T$, includes both the negative impact taxes and the positive impact of transfer payments.

A rise in such government purchases as highway construction, for example, causes an increase in aggregate demand while a fall in government purchases causes a decrease in aggregate demand.

Net exports

As seen earlier, net exports can vary with changes in the price level. For example, a drop in the Malaysian price level increases net exports because Malaysian exports are made cheaper in the rest of the world and imports are made more expensive in Malaysia. As a result of this foreign trade effect, a change in the price level influences total spending as a movement of the aggregate demand curve.

Other factors such as changes in incomes in foreign countries, currency movements (the rate of exchange), and changes in trade instruments (for example, tariffs) cause an overall change in net exports. Then aggregate demand changes at all prices: again there is a shift in the aggregate demand curve.

Foreign income

Consider two countries, Malaysia and the United States. Suppose Malaysia is the home country and the U.S. the foreign country. Suppose income rises in the U.S. Americans will be able to buy more products as a result: not only U.S.-made products but also those made in Malaysia. As a result, Malaysia's (net) exports to the U.S. will rise, thereby increasing Malaysia's aggregate demand. Conversely, a fall in the U.S. income will reduce Malaysian net exports, thereby decreasing Malaysia's aggregate demand.

Exchange rates

An *exchange rate* is the value of one nation's currency in terms of another currency. The value of the Malaysian ringgit, for example, can be expressed in any other currency but is usually compared with the U.S. dollar. Therefore, the exchange rate can show how many U.S. cents are needed to buy one Malaysian ringgit. A rise in the value of the Malaysian ringgit – for example, from 65 to 70 cents U.S. currency – means more American currency is needed to purchase Malaysian funds. In this example, Malaysia's currency becomes more expensive for Americans to purchase. At the same time, American currency becomes cheaper for Malaysians to purchase since more of it – 70 cents as opposed to 65 cents – is given in exchange for one Malaysian ringgit.

If the Malaysian ringgit goes up in value this way, exports from Malaysia become more expensive for Americans. Therefore, a product priced at RM1 in Malaysia costs not 65 cents in American funds but 70 cents. At the same time, American products imported into Malaysia fall in price when expressed in Malaysian currency. One Malaysian ringgit now buys American products with an American price of 70 cents, whereas earlier the same ringgit could buy American products with an American price of only 65 cents.

Because of the impact of exchange rates on prices, net Malaysian exports fall when the Malaysian ringgit goes up in value, causing aggregate demand to decrease. A drop in the value of the Malaysian ringgit has the opposite effect: net exports rise, thereby increasing aggregate demand.

Trade policies

Most industrial nations trade in environments characterised by trade restrictions such as tariffs and quotas and other administrative restrictions. In this setting, net exports and therefore aggregate demand will be affected by trade liberalisation initiatives whether on bilateral bases between two countries, multilateral bases within a regional trade agreement, or on a broader basis such as the World Trade Organization (WTO). For example, a reduction in general level of tariffs causes the aggregate demand curve to shift to the right, whereas instituting new barriers does the opposite.

Though aggregate demand comprises consumption, investment, government spending and net exports (exports *less* imports), keeping matters simple at this stage means you must assume a *closed* economy: i.e., one that conducts no foreign trade. Despite the importance of world trade, the closed economy assumption is not unrealistic. It approximates the position of the larger industrial countries or blocs such as Japan, the U.S. and the E.U., because *the larger the economic entity, the lower the ratio of trade to GDP*. A full discussion of the economy in a global context will be covered in Module 5.

Money and aggregate demand

We shall now turn our attention to the role of money and how it affects aggregate demand and the price level. Aggregate demand traces the relationship between output demanded and the price. The importance of the role of money in this discussion arises from (a) the fact that virtually all economic transactions in an industrial economy involve the use of money and (b) an important link between money and interest rates is imbedded in the aggregate demand relationship and feeds into the link between interest rates and investment. A full grasp of this link is a prerequisite to understanding of the demand side of the economy and therefore how the economy's general equilibrium is attained.

Money, interest rates and the price level

Suppose we define money as the stock of notes and coins held by the public, plus deposits in commercial banks. If people do not have enough money, they cut spending in an attempt to add to their money balances. If they feel they have too much money, they go out and spend it on goods, equities or bonds etc., in an effort to reduce their money stock. This link between desired money balances and aggregate spending is a major focus of attention in this analysis. Furthermore, when central banks inject more money into circulation, as defined below, banks can lend more easily since the supply of credit from which loans are extended has increased. This has an easing impact on lending rates and the cost of borrowing falls. Therefore, *an increase in supply of money into the economy by lowering the borrowing rates tends to stimulate spending and hence to increase aggregate demand*. The latter, in normal circumstances, in turn, will *increase production*. It also puts *pressure on prices*.

A full discussion of the role of money and monetary policy and the aggregate demand curve is done in the last section, where we will examine how the tools of monetary policy can shift aggregate demand and whether policy makers should use these tools for that purpose. At this point, however, you should have some idea about why the aggregate demand curve slopes downward and what kinds of events and policies can shift this curve. This section will also briefly discuss how financial markets function and how demand and supply of money (financial assets) interact to bring about equilibrium in that market.

The money market

The demand for money

Consider now what determines the amount of money people want to hold. If, for some reason, people were to feel that they had *too much* money and if they decided to spend part of their money on other financial assets such as bonds and equities or goods and services, this would have a dramatic impact on the level of aggregate demand. Note that money is conventionally and strictly defined as the sum of cash, or more appropriately *currency* (bills and coins of the central bank) as well as banks deposits.

Individuals typically hold a combination of various forms of financial assets. We can call this a *portfolio of assets*. In their portfolio, they hold a certain amount of currency on hand, a balance on deposit in the bank, and other forms of assets. The decision to hold this amount of currency (money) is influenced by availability of money substitutes such as credit cards and automatic bank teller machines. The impact of these on the amount of cash people demand is mostly noticed during the transitional period within which the public is in the process of utilising these new facilities and adapting to the new environment. Once the period of transition has passed, no further noticeable change should be observed.

People hold money for a variety of reasons. At this stage, however, a unique and indisputable reason is that, unlike other assets such as bonds and stocks, money can be used to buy the goods and services on a shopping list. How much money people choose to hold for this purpose, given the availability of credit cards and other similar facilities, depends on the level of their average income, the price of those products, and the interest rate.

1. *Income*. The richer you are, the more money you are likely to hold in absolute terms, even though the proportion of your total assets held as money may fall. Individuals hold currency to finance daily transactions. They use bank accounts to cover such items as monthly credit card charges, telecommunications bills, and other bills which fall due for payment on a regular basis. Companies require money for much the same reasons.
2. *The price level*. The higher prices are, the more money the typical transaction requires and the more money people will choose to hold in their wallets and cheque account. When prices fall, people reduce their demand for money by embarking on a shopping spree or allocating a bigger share of their portfolio to financial assets. Note the close link between the price level and aggregate demand implicit in this explanation.
3. *The interest rate*. No interest is paid on currency and deposits often receive only a token rate of return. Higher interest rates, therefore, increase the opportunity cost of holding money and reduce the demand for it.

The supply of money

Money supply is defined as the sum of currency in circulation plus public deposits with financial institutions. This definition, however, changes depending on the type of deposits included in it. Therefore, there are several types of money supply that central banks monitor. Some serve specific purpose and include only a limited number of deposits while other definitions of money consist of a wider spectrum of deposits, including saving deposits, term deposits, money market mutual funds, and foreign-currency-denominated deposits. A full discussion of this subject appears in Module 4 under the section on Financial Markets, Monetary and Fiscal Policy.

Figure 3.6 shows the elements of the money market. The nominal interest rate (*i*) is measured on the vertical axis and the quantity of money on the horizontal axis. The demand for money is represented by a downward sloping curve, *Md*. The logic behind this is that higher interest rates increase the opportunity cost of holding money and therefore decrease the quantity of money demanded. This curve is also referred to as the *liquidity preference curve*.

Supply of money, as discussed above, is determined by the central bank. Regarded as an exogenous variable – a factor whose value is determined outside the system money supply (stock) is represented by a vertical line in this space, *Ms*. The logic behind this is that the *quantity of money in circulation is independent of the rate of interest*. Equilibrium in the money market is achieved when $Md = Ms$, point E_1.

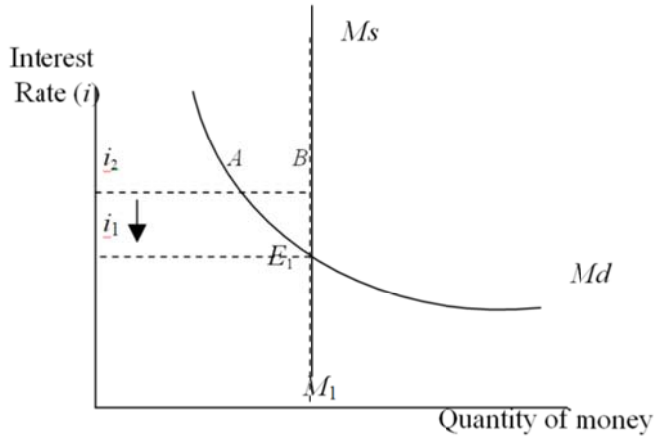


Figure 3.6

Other variables, such as inflationary expectations and credit card technology also affect the demand for money but we will ignore them for now in order to avoid unnecessary complications.

According to this mechanism, the interest rate adjusts to the level in which the demand for money is equal to the supply. To better understand how this mechanism works, assume that initially the interest rate is at a different level – say, i_2. This figure shows that at i_2, the demand for money is equal to $i_2 A$. The money supply is equal to $i_2 B$.

Therefore, money supply is greater than money demand excess supply of money. This is the case because at a higher interest rate, the opportunity cost of holding money is so high that the central bank makes more money available than the amount individuals wish to keep in circulation. Therefore, the interest rate must fall to balance demand and supply. Conversely, if the interest rate is below the equilibrium level, people will want to hold more money than the quantity available, and the interest rate must rise to balance demand and supply.

The following **Tables 3.2** and **3.3** summarise the points made on this topic so far.

1	*The wealth effect*	A lower *price level* increases real wealth, which encourages spending on consumption.
2	*The interest rate effect*	A lower *price level* reduces the interest rate by increasing the real value (purchasing power) of money in the hands of the public that, in turn, encourages spending on investment.
3	*The real exchange-rate effect*	A lower *price level* causes the real exchange rate to depreciate, which encourages spending on net exports.

Table 3.2 Factors that cause the aggregate demand curve to slope downwards

		Shift to the right	**Shift to the left**
1	Shifts arising from consumption	A change in consumption due to an increase in wealth unrelated to a change in the price level, e.g.: • A stock market boom • A tax cut	An event that makes consumers spend less, e.g.: • A tax hike • A stock market decline
2	Shifts arising from investment	Events that make firms invest more at a given price level, e.g.: • A fall in interest rates due to rising money supply • An increase in optimism about future expected profits	Events that make firms invest less at a given price level such as: • A rise in interest rates due • A decrease in money supply an increase in pessimism about future expected profits
3	Shifts arising from government purchases	An increase in government purchases • of goods and services, such as: greater spending on health and education • highway construction	A decrease in government purchases on goods and services, for example • A cutback in the allocated budget
4	Shifts arising from net exports	An increase in net exports due to: • A boom experienced by a major trading partner • An exchange-rate depreciation • A change in trade policy characterised by, for instance, reduced tariff barriers	An event that reduces spending on net exports at a given price level.

Table 3.3 Factors that cause a shift in the aggregate demand curve

Study skills

1. Which of the following events would shift the aggregate demand curve to the left?

   A. A decrease in tax rates

   B. An increase in government spending

   C. An exchange rate appreciation

   D. A fall in the price level

Solution:

C. A and B cause a rightward shift, whereas D causes a movement along the curve. An exchange rate appreciation makes domestic exports more expensive and hence reduces aggregate demand.

Output, aggregate supply and its components

Gross domestic product measures both expenditure and output. The previous section viewed the expenditure approach as *aggregate demand*. Output the other side – represents the production of the goods and services that are demanded. Now let us turn our attention to the role of production.

The aggregate supply curve

Let us look at the elements that make up supply. The supply side of the economy (production) consists of two elements:

1. Input markets: Consist of labour, capital and raw materials.
2. The production function: A technological relationship that relates inputs to output while the manner in which they are combined is the technology.

At the microeconomic level, this is a vital managerial concern discussed in Module 2. From a macroeconomic perspective, however, the availability and growth of the factors of production determine the potential for growth by the overall economy.

The aggregate supply curve shows combinations of real output (Y) and the price level (P) which are consistent with the equilibrium in the production side of the economy. **Figure 3.7** shows different aggregate supply curves. The price on the vertical axis of the aggregate supply curve is the general price level. This contrasts with the industry supply curves in Module 1, where the price of the industry's output is on the vertical axis. The industry supply effect arises because the price of the industry's output is defined relative to prices in other sectors. All other prices are assumed to remain constant. In the case of the aggregate supply curve, the general price level is defined relative to prices of productive factors such as labour.

Your intuition may tell you that the price level and real output should be directly related, giving the aggregate supply curve a positive slope. At

higher price levels in the economy, businesses are encouraged to produce more, whereas at lower prices businesses may not be able to make a profit or break even in the *short run*, so they reduce output. Indeed, this is typically the situation, in the short run. A rise in the general price level relative to nominal wages has a positive effect on aggregate supply and the aggregate supply curve will be positively sloping.

Contrarily, if one believes that the price of labour (and other productive factors) is linked to the general price level – because, let us say, employees demand higher pay to compensate for inflation – there can be no relative price effect and the aggregate supply curve will tend to be *vertical*. This is regarded as a *long-run* situation.

In conclusion, a vertical aggregate supply curve shows that a given level of real output, Y_n, is consistent with many possible price levels. A positively-sloped supply curve shows that a rise in the price level from P_1 to P_2, is consistent with a rise in output from Y_n to Y_2 — the short-run aggregates supply curve is upward sloping. This line of reasoning, as you will see, has important implications for macroeconomic policy.

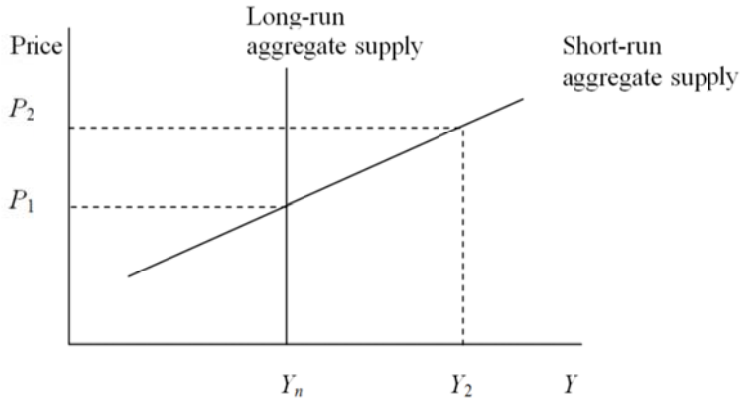


Figure 3.7

A key distinction here is between *actual* GDP (output) and *natural or potential* GDP (Y_n), where natural GDP represents the output of goods and services that would be produced if the unemployment rate were at its natural, or normal, rate. The natural level of output is the level of production toward which the economy gravitates in the long run.

The notion of natural output or full-employment output needs some clarification. The concept of the normal (natural) unemployment rate does not, however, imply zero unemployment, nor does "natural level of output" imply the maximum output. A term that economists have used in the past is "full-employment unemployment rate". You may wonder at economists' tolerance for apparent nonsense. Today, the term "natural rate of employment" has replaced this contradiction in terms, paired with "natural output" for productivity. More light has been shed on this issue in the last section.

Determination of natural level of output

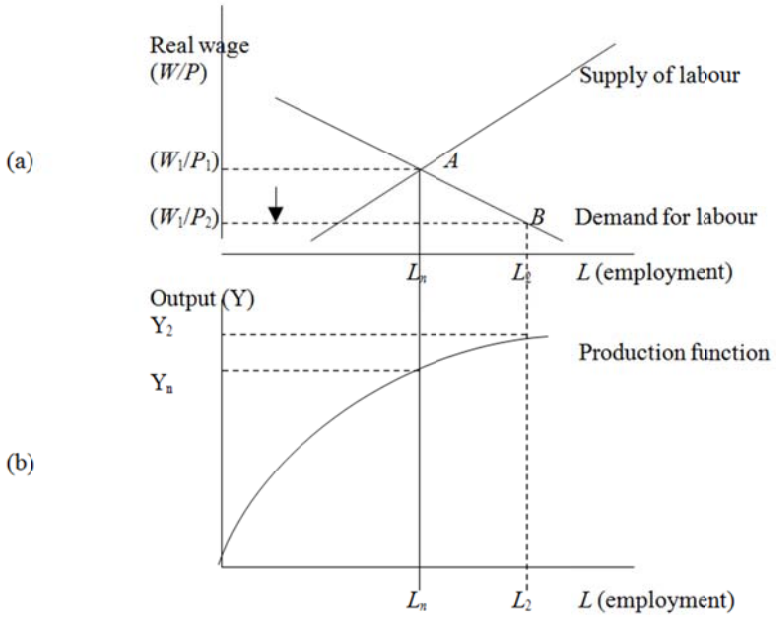


Figure 3.8

Two steps are involved in determining the natural level of GDP, Y_n. The first is to determine the natural level of employment, L_n and the second, to read off the level of output from the production function. Natural level of employment is the employment counterpart of natural output. The natural level of employment is by definition attained when the labour market clears – where demand and supply cross each other as seen in **Figure 3.8**. Also determined at this intersection point, indicated in Panel (a), is equilibrium real wage. Second, having determined equilibrium of employment (L_n) and equilibrium real wage, you can read off the level of output from the production function, Panel (b). The production function – more correctly the *short-run* production function – indicates the level of output that can be produced by each level of labour input, assuming it is combined with a fixed capital stock (K), technology and other factors. Thus, it shows that an output of Y_n can be produced by the input of labour, L_n.

The equilibrium real wage in **Figure 3.8** is represented by (W_1/P_1). Note that the *real wage* is the ratio of the market or nominal wage (monthly or weekly pay), W, to the price level, P, which in this equilibrium are assumed to be W_1 and P_1, respectively. The real wage, W/P, is a measure of the *purchasing power of workers' income*. The reason behind having the real wage appear on the vertical axis in the panel (a) is that both workers – who are behind the supply of labour curve – and firms – which are behind the demand for labour curve – behave rationally. They calculate, bargain and decide if and how much to work on the basis of the real wage, not the nominal money wage. In technical jargon, all market participants are assumed to be *free from money illusion*.

Short-run versus long-run aggregate supply curve

The distinction is often drawn between the long-run aggregate supply curve (*LRAS*), which is vertical, and the short-run aggregate supply curve (*SRAS*), which is upward- sloping, as seen in **Figure 3.7**. The proof of this, however, is provided by **Figure 3.8**. A rise in prices could lead to higher output if (nominal) wages did not change, or in other words, if wages were *sticky*. As shown in Panel (a), when the price increases to P_2, the amount of labour employed increases to L_2. Corresponding to this rise, as shown in panel (b), is an increase in output to Y_2. Therefore, a new equilibrium point is reached at output Y_2 and price P_2. The *increase in price has brought about an increase in output*. Put differently, a change in price has a real effect on that the quantity of output produced, in the short run. Tracking the effects of different price levels and joining the points together produces an upward-sloping *SRAS* curve.

The wage *stickiness* in the analysis might be present because the rise in price was unanticipated or due to fixed-term pay deals. Employees might require time to absorb the implications of the rise in price and may react more slowly than firms do to the new price level. For these reasons, price changes can have real effects on output and employment in the short term.

The existence of rigidities and short-term wage stickiness may be intuitively acceptable as a working assumption of how the labour market operates in the short run. But such irrational behaviour cannot be sustained indefinitely. Eventually, employees will respond in a rational manner. Therefore, you might query how long it will take them to respond. The length of the short run is not generally agreed upon; it is likely to vary from country to country, and even from region to region.

Changes in aggregate supply

As discussed above, the short-run aggregate supply curve is an upward-sloping function of price. However, other factors in addition to the price level can influence real output. These factors change real output at all price levels. In other words, they shift the aggregate supply curve. Once again, as we examine each in turn, we must assume other factors remain constant (*ceteris paribus*).

Input prices

Aggregate supply assumes steady input prices for the businesses that are producing the output. Changes in input prices – an increase in wages, for example, or increased prices for imported raw materials give rise to a rise in production costs. These changes can occur frequently over brief periods of time. When a rise in the price of an input pushes up production costs, businesses reduce their real output and the short-run aggregate supply curve shifts to the left. Note, however, that unless input price increases happen to be long-lasting, no changes will happen to the economy's potential output. That is, the long- run aggregate supply curve remains unchanged.

Conversely, if the price of an input decreases, production costs fall. Businesses then raise their real output, causing the aggregate supply curve to shift to the right.

Resource supplies

Over the long term, supplies of resources in an economy, especially human and capital resources, tend to grow. With any such increase, businesses produce more real output at every price level. In other words, more inputs over the long run increase aggregate supply as well as the economy's potential output. The reverse is also possible. With a long-run reduction in the amounts of any resource, businesses will produce lower real output at all prices, thereby causing a long-run decrease in aggregate supply which is accompanied by a reduction in the economy's potential output. In such cases, both the long-run and the short-run aggregate supply curve shift.

Technological knowledge

One of the most important reasons the economy today produces more than it did a generation ago is that our technological knowledge has advanced. The invention of the computer and Internet, for instance, has allowed us to produce more goods and services from any given amounts of labour, capital, and natural resources. A technological innovation raises productivity: the same amount of economic resources can produce more real output at every price level and hence can shift the long-run aggregate-supply curve to the right.

Government policies

Government policies can also influence aggregate supply through their effects on the business environment in an economy. For example, suppose that taxes rise for businesses and households. Because the after-tax returns on supplying economic resources are reduced, businesses and households may reduce the resources they supply at every price level. As a result, real output falls, causing a long-run decrease in aggregate supply. Conversely, lower taxes may encourage businesses and households to increase their supply of economic resources, leading to a rise in real output and a long-run increase in aggregate supply.

Government regulations such as environmental and safety standards, typically raise per- unit costs for some businesses while lowering it for others (especially those that have been adversely affected by lax regulations). Hence, more regulation causes some businesses to produce less and, at the same time, other businesses to produce more output at every price level. Therefore, the effect on aggregate supply is ambiguous. This continues to be a controversial issue.

Factors causing the short-run aggregate supply curve to slope upwards

'Stickiness': The sticky wage and the price theory

Because nominal wages are slow to adjust (sticky) in the short run, long-term employment contracts affect changes in product prices experienced by firms. These price changes do not immediately translate to changes in money wages.

The sticky price theory regards the slow adjustment in prices as the cause of the upward sloping supply curve because of the implicit agreement between vendors and their customers or because of large costs of adjusting the price. For example, newspapers do not adjust their prices periodically, despite economic conditions.

Wage stickiness			
	Wage impact	**Cost of hiring**	**Effect on production**
When the price level *falls*	. . . then the real wage (W/P) *rises*	...pushing costs of hiring labour to firms higher and,	...therefore, forcing the firms to hire less labour and produce less goods and
A *rise* in P has the opposite effect	...so that the real wage (W/P) *falls*,	...reducing firms' costs of hiring labour and...	...causing firms to hire more and produce more.

Price stickiness			
	Demand impact	**Revenue impact**	**Effect on production**
Change in economic condition other than price	Reduced purchasing power	Less revenue to firms	Reducing sales and production
Change in economic condition other than price	Increased purchasing power	More revenue to firms	Increasing sales and production

Table 3.4 Stickiness factors causing the short-run aggregate supply curve to slope upwards

With prices being sticky in the short run, a change in economic condition which reduces the overall purchasing power of buyers will cause a drop in sales and production, whereas an opposite situation will have a positive effect on sales and production in the short run.

The imperfect information theory

Both firms and workers may in fact base their decisions on incomplete information or misperceptions in the short run. Firms may misinterpret market signals. That is, they may temporarily mistake a general increase or decrease in the overall price (P) for a change in the price in individual markets (relative to other markets). Workers may also misinterpret the situation. Since they tend to notice a change in their (nominal) wage before they notice a change in the price level, they may mistake the former for a change in their real wage and act accordingly.

Technological changes		
Shifts arising from inputs:		
Input	**Mechanism**	**Shift**
Capital	Changes in capital stock of the economy affect labour productivity	Increased volume of goods and services causes a rightward shift in the aggregate supply curve; decreased volume cause a leftward shift.
Natural Resources	Changes in supply	With a rise (fall) in the supply of natural resources the aggregate supply curve shifts to the right (left).
Labour	Changes in labour force size	An increase in the size of the labour force increases the supply of output of the economy — a rightward shift in the aggregate supply curve — and vice versa.

Table 3.5 Factors causing a shift in the long-run aggregate supply curve

Factors causing a shift in the short-run aggregate supply curve

The short-run aggregate supply curve shifts arise from:

- The same factors that caused a shift in the long-run aggregate supply curve. If the long-run aggregate supply curve shifts to the right (left), the short-run aggregate supply curve shifts along with it to the right (left).
- Changes in people's expectations of the price level. The short-run supply of goods and services also shifts with changes in expectations of the price level, which in turn depends on perceptions of wages and prices. An increase (decrease) in the expected price level causes a leftward (rightward) shift in the short-run aggregate supply curve.

General equilibrium

Long-run equilibrium occurs when aggregate demand and supply are put together (**Figure 3.9**). You then obtain the equilibrium price and income levels in the economy at Y_n and P, point E. At that point E, national expenditure equals national income and also equals national output. This is where *AD* crosses *LRAS*. Note however, that the short-run and long-run equilibrium points coincide with each other. By the time the economy has reached this long-run equilibrium, there will have been adjustments in perceptions, wages and prices so that the short-run aggregate supply curve crosses this point as well.

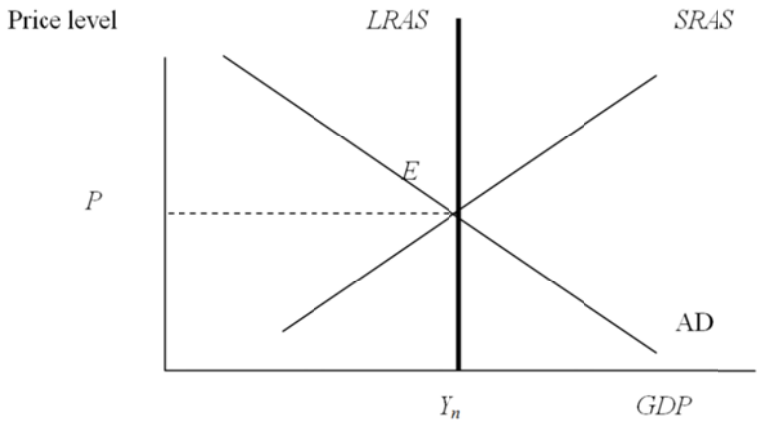


Figure 3.9

Short-run macroeconomic equilibrium and business cycles

The business cycle occurs because aggregate demand and short-run aggregate supply fluctuate but the money wage rate does not adjust quick enough to keep the actual GDP at potential GDP. **Figure 3.10** shows two types of short-run macroeconomic equilibrium.

Panel (a) shows an *above-full-employment (over-employment) equilibrium situation*. This type of equilibrium is a short-run macroeconomic equilibrium in which actual GDP, Y_2, exceeds potential GDP, Y_n. The amount by which actual GDP exceeds potential GDP is called *an inflationary gap*, $(Y_2 - Y_n) > 0$. As the name suggests, this gap is poised to create inflation. This gap occurs either because the economy has experienced a boom or because actual GDP, while growing, has grown faster than potential GDP.

Panel (b) shows a *below-full-employment (or underemployment) equilibrium* situation. A below-full-employment (underemployment) equilibrium is a short-run macroeconomic equilibrium in which actual GDP falls short of potential GDP. The gap between actual GDP and potential GDP is called a *recessionary gap*, $(Y_1 - Y_n) < 0$. As the name suggests, this occurs either because the economy has experienced a recession or because actual GDP, while growing, has grown more slowly than potential GDP.

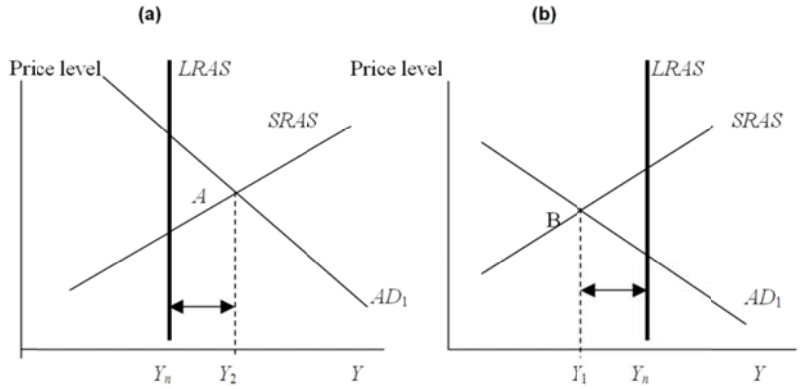


Figure 3.10

Adjustments in the long run

An important question that arises is whether the economy can forever produce in excess of its potential GDP as illustrated in **Figure 3.11** Panel (a) — or stay below that potential, as in Panel (b). Are there forces that bring actual GDP back to its potential (natural) level? These questions need to be addressed before we can tackle policy implications. Remember that when the economy *moves along its SRAS curve, the price level changes while the wage level remains unchanged*. This, therefore, causes an adjustment in the real wage, *W/P*, which in turn tends to entail further adjustments.

Consider panel (a) in **Figure 3.11**, which represents an *over-employment* equilibrium situation, point *B*, and an inflationary gap of ($Y_1 - Y_n$) magnitude. At point *B* relative to *A*, price has risen while the nominal wage remained constant. Therefore, workers have experienced a fall in the buying power of their wages while the firms' profits have increased from the reduced real cost of workers. Eventually, workers will demand higher (money) wages; firms, anxious to maintain their employment and output levels, will meet those demands. If firms do not raise money wage rates, they will either lose workers or end up hiring less productive ones.

As the money wage rate rises, the short-run aggregate supply curve shifts leftward from $SRAS_1$ towards $SRAS_2$ and this produces a sequence of new equilibrium positions. The economy moves up along its aggregate demand curve, AD_1, as shown by the arrowheads in the figure, as actual GDP decreases and the price level rises.

Figure 3.11

Eventually, the money wage rate would have risen by the same percentage as the price level. At this time, the aggregate demand curve AD_1 intersects $SRAS_2$ at a new long-run equilibrium, point C, where actual GDP is equal to potential GDP once again.

In contrast, panel (b) represents an *underemployment* equilibrium situation, point B', and a recessionary gap of $(Y_n - Y_2)$ magnitude. At B' relative to A', price has fallen while money wage stayed constant. The lower price level has increased the purchasing power of wages (real wage) and decreased firms' real costs. Eventually, the slack in the economy will lead to a falling money wage rate: workers anxious to maintain their jobs and the unemployed, anxious to find a job, will give in under pressure. The short-run aggregate supply curve will then shift rightward to $SRAS_2$. Eventually, the aggregate demand curve (AD_1) will intersect $SRAS_2$ at a new long-run equilibrium, point C', where actual GDP is equal to potential GDP once again.

Causes of economic fluctuations

The model of aggregate demand and aggregate supply gives you the basic tools you need to analyse fluctuations in economies. At this stage, let us examine two basic causes of short-run fluctuations and then, in the next unit, you can refine your understanding of how to use these tools.

Shifts in aggregate demand

Figure 3.12 shows an economy in long-run equilibrium. As expected, equilibrium output and the price level are determined by the intersection of the AD curve and the *LRAS* curve, shown as point *A*. The short-run aggregate-supply curve passes through this point as well, indicating that perceptions, wages and prices have fully adjusted to this long-run equilibrium.

Suppose that a series of disappointing earnings depresses the stock market and a wave of pessimism suddenly hits the economy. Because of these events, many people lose confidence in the future and alter their plans. Households may cut back on their spending and delay major purchases, firms may put off buying new equipment, or people may sell equities in order to hold more of their wealth in the form of money.

As result of these developments, the aggregate demand for goods and services will be reduced because of a drop in both consumer spending and spending by firms. As shown in **Figure 3.12**, the aggregate-demand curve shifts to the left from AD_1 to AD_2. In the short run, the economy moves along the initial short-run aggregate-supply curve, $SRAS_1$, from point *A* to point *B*, where output is reduced from Y^n to Y_2, and the price level fall from P^1 to P^2. The gap shown by $(Y^n - Y_2)$ indicates a *recessionary gap*. Although the employment effect is not shown in the figure, firms respond to lower sales and production by reducing employment. Thus, the pessimism that caused the shift in aggregate demand is, to some extent, self-fulfilling: pessimism about the future leads to falling incomes and rising unemployment.

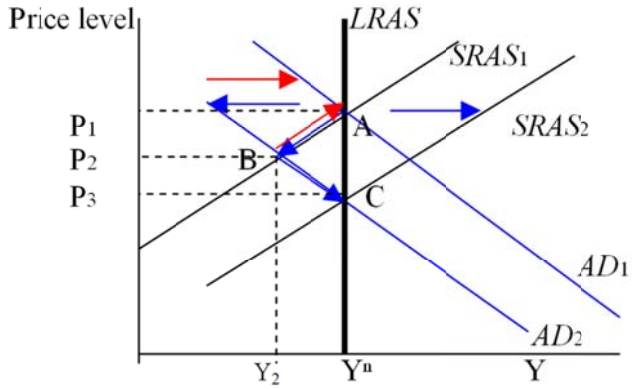


Figure 3.12

In the absence of any action by policy-makers, a no-action or hands-off stance, the *recessionary gap* will force the price level to fall. Eventually, expectations will adapt to this new reality of rising unemployment and slowing economy. Perceptions, wages and expected prices will all be revised downward, causing a shift in the short-run aggregate- supply curve to the right towards $SRAS_2$, in the above figure. Over time, the economy will approach point *C*, where the new aggregate-demand curve (AD_2) crosses the long-run aggregate-supply curve.

The economy, in this case, has remedied itself over a period of time. In the new long-run equilibrium, point *C*, output is back to its natural level. Even though the wave of pessimism reduced aggregate demand, the price level has fallen sufficiently (to P_3) to offset the shift in the aggregate-demand curve.

Alternatively, faced by the reality of economic hardship in the recessionary period, the period that it takes for the economy to move from

B to *C* in **Figure 3.12** — and the fact that the transition towards long-run equilibrium may be long and painful for the economy and the unemployed, policy makers may choose to take action to accelerate the recovery instead of waiting for the system to remedy itself. This action typically takes the form of increasing money supply or government spending.

If policy makers can act with sufficient speed and precision, they can offset the initial shift in aggregate demand by increasing money supply or government spending to move the aggregate demand curve back to AD_1 and bring the economy back to point *A*.

Shifts in aggregate supply

As we know, a shift in the aggregate supply curve arises from a change in supply of factors of production (inputs) or technology. For example, let us consider an economy in its long-run equilibrium. Suppose that suddenly some firms experience an increase in their costs of production due to an increase in the price of raw materials. A standard textbook example in the 19th century was a crop failure due to bad weather; in the 20th century, the rising price of oil triggered by an oil cartel such as OPEC. The 21st century example may return to such environmental or seismic disasters as an earthquake under a microprocessor plant complex.

What is the macroeconomic impact of such an increase in production costs? For any given price level, firms now want to supply a smaller quantity of goods and services.

Thus, as **Figure 3.13** shows, the short-run aggregate-supply curve shifts to the left from $SRAS_1$ to $SRAS_2$.

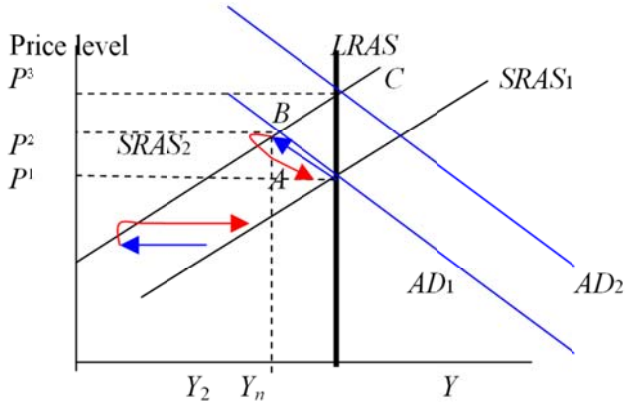


Figure 3.13

In the short run, the economy moves along AD_1 to point *B*, where output of the economy has fallen from Y_n to Y_2 and the price level has risen from P_1 to P_2. Because the economy is experiencing *stagnation* (falling output) and *inflation* (rising prices), such an event is called *stagflation*.

What should policymakers do when faced with stagflation? Unfortunately, there are no easy choices. One possibility is to do nothing.

In this case, the output of goods and services remains depressed at Y_2 for a while. Eventually, however, the recession will remedy itself as perceptions, wages and prices adjust to the higher production costs. The prevailing period of low output and high unemployment puts downward pressure on workers' wages. Lower wages, in turn, increase the quantity of output supplied. Over time, the short-run aggregate-supply curve shifts back toward $SRAS_1$, the price level falls, and the quantity of output approaches its natural level. In the long run, the economy returns to point A, where the aggregate-demand curve crosses the long-run aggregate-supply curve. In this case, policymakers make the choice of *maintaining a low price level at the cost of temporarily lower output and employment*.

Alternatively, policymakers who control money supply and government spending as well as taxes might attempt to offset some of the effects of the shift in the short-run aggregate- supply curve by shifting the aggregate-demand curve. This possibility is shown in **Figure 3.13**. In this case, changes in policy shift the aggregate-demand curve to the right to AD_2, exactly enough to prevent a shift in aggregate supply from affecting output. The economy moves to point *C*. Output remains at its natural level, but the price level rises from P_2 to P_3. In this case, policymakers are said to *accommodate* the shift in aggregate supply because they allow the increase in costs to affect the level of prices permanently. Policymakers make the choice of *maintaining a constant level of real output and employment at the cost of a permanently higher price level*.

Module summary

Summary

This module has offered the basic definitions for understanding of GDP, GNP, CPI and unemployment. You have learnt the calculation of national income and the contrast of nominal and real GDP.

You have also reviewed the concepts of aggregate demand, aggregate supply and their equilibrium. Business cycle is the formation where output and expenditures follow a cycle of expansions and contractions.

In the following modules, you will be looking at money, financial institution system, monetary policies, fiscal policies, Phillips Curve, inflation and unemployment.

Assignment

Assignment

1. Define Gross Domestic Product (GDP).
2. Explain the difference between nominal GDP and real GDP.
3. What does the unemployment rate measure? Briefly explain how it is calculated.
4. What is the GDP deflator and how is it calculated?
5. What is the Consumer Price Index (CPI) and how is it calculated?
6. Why should we be concerned about an increase in the unemployment rate? Briefly explain.
7. Increases in the rate of inflation can have a number of negative effects on the economy. Briefly explain two (2) of them.
8. What component of aggregate demand is related to disposable income?
9. What does marginal propensity to consume represent?
10. What are the key determinants of investment spending?
11. Explain the marginal propensity to consume (*MPC*) and the marginal propensity to save (*MPS*). Prove that why *MPC* + *MPS* always equals 1.
12. What is the role of exchange rates in determining aggregate demand? Which component of *AD* is influenced?
13. Explain why *AD* is a downward-sloping function of the price level.
14. What factors cause a movement along the *AD* curve; what factors are responsible for a shift in that curve?
15. Why is potential GDP independent of the price level?
16. What curves, *AD*, *SRAS* and *LRAS*, are the determinants of output (GDP) and the price in the short run?
17. What is the determinant of price in the long run — *AD*, *LRAS* or *SRAS*?
18. What is stagflation?
19. What is the link between money market and aggregate demand?
20. What are the causes of business cycles?
21. What is money supply? How might it be controlled by the authorities? What forces in the economy tend to bring money supply and money demand into equilibrium?

Assessment

Assessment

1. Consider an imaginary economy that produces only three goods: steak, eggs and wine. Information on the quantities and prices of each good sold for two years is given below.

	1997	2001
Output		
Steak (kgs)	10	7
Eggs (dozens)	10	13
Wine (bottles)	8	11
Price		
Steak (per kg)	$9.10	$11.50
Eggs (per dozen)	$1.10	$1.30
Wine (per bottle)	$6.00	$6.50

For this hypothetical economy, calculate each of the following:

   A. Nominal GDP.
   B. Real GDP in constant year 1997 dollars (i.e., 1997 is the base year).
   C. GDP deflator.
   D. The percentage of change in real GDP and the GDP deflator between year 1997 and year 2001.

2. On the basis of your analysis in question 1, was nominal GDP in year 1997 greater than, less than or equal to real GDP in year 1997? If the values for nominal and real GDP in year 1997 are different, explain why this is so.

3. Suppose you are provided with the following information about an economy that consists of just three firms.

STEEL COMPANY	
Revenues from sales	$400
Expenses (wages)	$340
Profits	$60

LOBSTER COMPANY	
Revenues from sales	$200
Expenses (wages)	$160
Profits	$40

CAR COMPANY	
Revenues from sales	$1,000
Expenses	
Wages	$500
Steel purchases	$400
Profits	$100

A. Using the final goods approach, what is the GDP?

B. Calculate the value added for each of the three firms. Based on your calculations, what is the GDP using the value-added approach?

C. What are the total wages (what is the labour income) in this economy? What are total profits in this economy? Given your calculations and using the incomes approach, what is the GDP?

D. Compare the levels of GDP obtained in parts (a), (b) and (c). Which of these approaches yields the highest and smallest level of GDP? Explain.

E. Based on your analysis, what percentage of GDP is allocated to: (1) labour income and (2) profits?

4. Suppose nominal GDP in year 2000 increased by 7 per cent (over its level in year 1999). Based on this information, what happened to the rate of inflation (as measured by the GDP deflator) and real GDP growth between year 1999 and year 2000? Explain.

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

Year	Nominal GDP (millions of dollars)	GDP deflator (1997 = 1.0)	Real GDP (in millions of year 1992 dollars)
1996	839,331	0.989	
1997	885,022		885,022
1998		0.996	919,770
1999	975,059	1.009	
2000	1,055,604	104.600	

A. What was nominal GDP in year 1998? What was the GDP deflator in year 1997?

B. Using the GDP deflator (where 1997 = 1.0), calculate real the GDP for the remaining years.

C. Using your calculations in part (B), compare the levels of real GDP with the levels of nominal GDP for each year. What does this comparison suggest about prices in that year (relative to year 1997)?

D. Explain why economists focus on real rather than nominal GDP when analysing the level of an economy.

6. What sectors are least affected by a downturn?

7. Identify the impact of each of the following trends on aggregate demand. In each case, draw a graph to show the effect on the aggregate demand curve as well as on the equilibrium price level and real output.

A. Consumers become more confident about the prospects for output growth in the economy.

B. Interest rates rise.

C. Political pressure causes an increase in tax rates on households earning high incomes.

D. Oil prices rise everywhere.

E. The local currency rises in value against the currency of the trading partners.

8. Assume that your economy has the following aggregate demand and supply schedules:

Real GDP Demanded (billions of dollars)	Real GDP Supplied (billions of dollars)	Price Level in the short run
520	120	100
440	140	110
360	160	120
280	180	130
200	200	140
120	220	150
40	240	160

A. In a figure, draw the aggregate demand and short-run aggregate supply curve.

B. What are the short-run equilibrium values of real GDP and the price level in your economy, based on this information?

C. If your economy is capable of producing $220 billion at its potential, what is the size of the output gap? Is there a recessionary gap or inflationary gap? Draw the long-run aggregate supply curve.

9. Using the aggregate supply relation, explain how each of the following events will affect the price level and output. Make sure you explain the relevant shifts in the supply relationships, if any, first.

A. 10 per cent increase in wages.

B. 5 per cent increase in the price of a key raw material.

C. Increase in technology

10. Suppose $Y > Y_n$.

A. What type of an output gap does this represent?

B. What does this mean for prices and GDP in the future?

C. What will happen to the expected price next year?

D. What will happen to nominal wages next year?

11. Answer all parts of question 10 if $Y < Y_n$.

12. Assume the economy is initially operating at Y_n. Now suppose the Central Bank increases money supply.

A. Use a graph of AD-SRAS to illustrate the initial equilibrium situation.

B. What are the initial effects of the increase in money supply on P, M/P, interest rate, and GDP? You may find it useful to sketch a money market diagram in the background first.

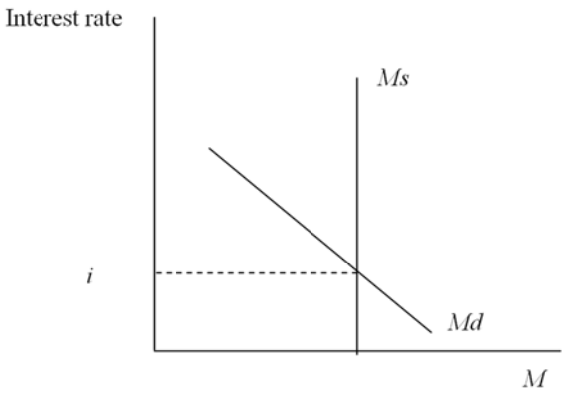
C. Does Y return to Y_n? And if so, what does this suggest about the price and the expected price?

13. Explain what happens to money demand and bond demand as a result of each of the following events:

A. A 10 per cent increase in real GDP.

B. A reduction in interest rates.

14. Use the space provided below to answer this question.



A. How much money do individuals hold at the initial interest rate (i)? Show this in the graph.

B. Suppose there is a reduction in the money supply. What effect will this have on the money supply curve and on the interest rate? Show this effect graphically.

C. At the initial interest rate of i, what has happened to the actual quantity of money?

D. What must happen to the interest rate to restore equilibrium?

E. As i changes, what happens to money demand?

F. How much money do individuals hold at this new interest rate? Compare your answer here with your answer to part (A).

Assessment answers

1. A. Nominal GDP in 1997 ($Y) = $9.10 x 10 + $1.10 x 10 + $6 (8) = $150

   In 2001: $Y = $11.50 (7) + $1.30 (13) + $6.50 (11) = $168.90

   B. Real GDP in constant 1997 dollars: Y = $9.10 (7) + $1.1 (13) + $6 (11) = $144.

   C. GDP deflator in 1997 = base year = 1 by definition.

   GDP deflator in 2001 = $Y/Y = $\frac{\$168.9}{\$144} = 1.17$

   D. % change in Y = −4%. % change in the deflator is 17%.

2. Nominal GDP and real GDP in 1997 are the same since we use the same prices to calculate both figures (base year).

3. A. The final product of steel is 0 since steel is not a final good. The final product of the lobster company is $200, and the final product of the car company is $1000. GDP = $200 + $1000 = $1200.

   B. Value added for steel is $400. Value added for the lobster company is $200. Value added for the car company is $1000 = $400 = $600. GDP = $400 + $200 + $600 = $1200

   C. Total wages are $1000. Total profits are $200. GDP is $1000 + $200 = $1200.

   D. All three approaches to GDP yield the same value.

   E. Labour share is 83%, profit's share is 17%.

4. Without more information, we can say nothing about inflation rate and real GDP. Nominal GDP can change because of changes of either one or both.

5. A. $Y (1998) = $91609.92 million (919,770 X .996)

   The deflator is = 1

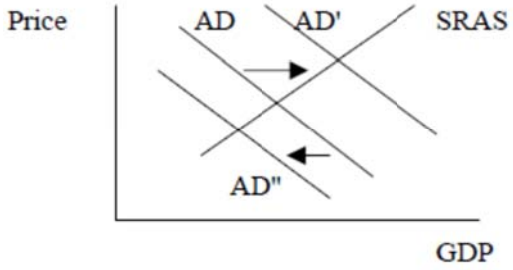
   B. Y (1996) = $839,331 million, Y(1999) = $966,361.74, in 2000 (Y=$1,009,181)

   C. Where the deflator is less than 1 (prior to 1997), real GDP is greater than nominal GDP. Where it is greater than 1 (after 1997), real GDP is less than nominal, and where the deflator is equal to 1 (in 1997), real and nominal GDP are equal.

   D. Because nominal GDP incorporates changes in price and quantity and therefore does not offer useful information from the perspective of the study of growth and business cycles.

6. The sectors that are less sensitive to changes in income are least affected by a downturn. That includes food industry (agriculture), government-regulated industries, low-price transportation, basic services and necessities.

7. A. AD shifts to the right, AD'. Price and GDP rise.



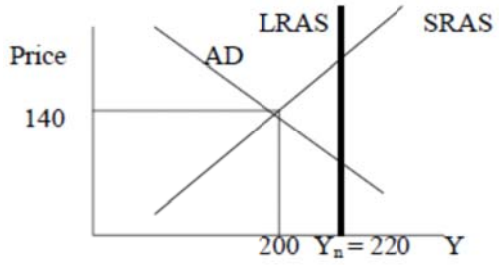
   B. AD shifts to the left, AD". Price and GDP fall.

   C. AD shifts to the left same as b. P and GDP fall.

   D. AS shifts to the left, no shift in AD. Price increases, GDP falls.

   E. AD shifts left as in c. Price and output fall.

8. A.



   B. P = 140, GDP = 200

   C. Output gap = 220 −200 = 20, a recessionary gap.

9. A. AS shifts to the left. Cost rises and hence price level rises. GDP falls.

   B. AS shifts to the left (the same as part a). Price rises. GDP falls.

   C. AS shifts to the right. GDP increases and price falls.

10. A. Inflationary gap.

   B. Price rises, GDP falls back to Y_n.

   C. Expected price will rise next year, because of inflationary pressure.

   D. Nominal wages will rise to catch up with the increases in price.

11. This is the opposite of 5.

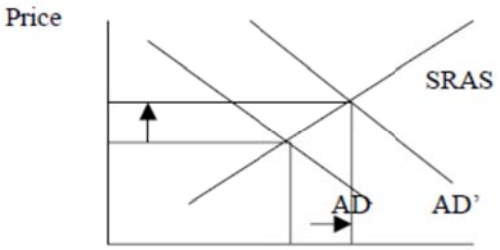
   A. Deflationary gap.

B. Price falls, GDP rises to return to Y_n.

C. Expected price will fall.

D. Nominal wages will fall.

12. A.



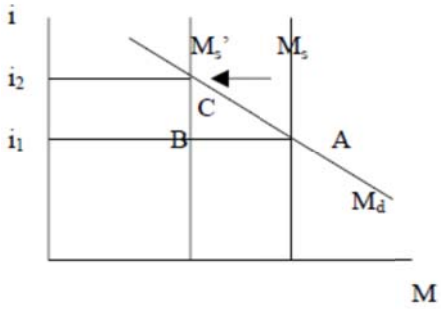
B. AD shifts to the right, P rises, M/P increases initially, interest rates drop and GDP increases.

C. Yes, Y returns to Y_n since in the next period P^e (expected price) increases (money wage increase), SRAS shifts back and the economy returns to Y_n.

13. A. A 10% increase in GDP causes demand for bonds and demand for money to increase.

B. Money demand rises, bond demand falls.

14. A



A. At the initial level of i, M_d is equal to M_s (point A).

B. The M_s curve shifts leftward to $M_{s'}$.

C. At the initial interest rate (i_1), there is an excess demand for money (AB).

D. The interest rate must rise to i_2 to restore equilibrium.

E. As the interest rate rises toward i_2, M_d diminishes (a movement along the M_d curve), to meet $M_{s'}$ at C.

F. $M_d = M_s$ at the new equilibrium interest rate i_2. As M_s decreases, so does M_d.