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PRINCIPLES OF MACROECONOMICS I

(Department of Economics)

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PRINCIPLES OF MACROECONOMICS I
Study Material: Lesson 1-9

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LESSON–1

MACROECONOMIC ISSUES

STRUCTURE

1.1 LEARNING OBJECTIVE

The need for studying macroeconomics as a separate branch of economics arises out of the fact that macro-behaviour is often different from micro-behaviour. A simple illustration can be the behaviour of saving. The study of macroeconomics is important as it provides a thorough understanding of various macro variables and its interactions. The present lesson is introductory in nature and explains some basic concepts and issues of macroeconomics.

After going through this lesson, you should be able to explain:

- The broad understanding of macroeconomics variables and their measurement issues like GDP, inflation, money supply, unemployment etc.
- Tries to critically evaluate the various macroeconomic policies and their effects on output and interest rates in the economy
- Helps to determine the relationship between the socio-economic factors and equilibrium level of income

1.2 INTRODUCTION

Macroeconomics is concerned with the structure, performance and behaviour of the economy as a whole. The study of the macroeconomics investigate the working of the wider economy, including the measurements and determination of national income, output and expenditure and the consequences for the employment and prices. The prime concern of macroeconomists is to analyse and attempt to understand the underlying determinants of the main aggregate trends in the economy with respect to the total output of goods and services (GDP), unemployment, inflation and international transactions. In particular, macroeconomic analysis seeks to explain the cause and impact of short-run fluctuations in GDP (the business cycle), and the major determinants of the long-run path of GDP (economic growth). Obviously the subject matter of macroeconomics is of crucial importance because in one way or another macroeconomic events have an important influence on the lives and welfare of all of us. It is difficult to overstate just how important satisfactory macroeconomic performance is for the well-being of the citizens of any country. An economy that has successful macroeconomic management should experience low unemployment and inflation, and steady and sustained economic growth.

In contrast, in a country where there is macroeconomic mismanagement, we will observe an adverse impact on the living standards and employment opportunities of the citizens of that country. In extreme circumstances the consequences of macroeconomic instability have been devastating. For example, the catastrophic political and economic consequences of failing to maintain macroeconomic stability among the major industrial nations during the period 1918–33 ignited a chain of events that contributed to the outbreak of the Second World War, with disastrous consequences for both humanity and the world economy.

Because macroeconomic performance and policies are closely connected, the major macroeconomic issues are also the subject of constant media attention and inevitably play a central role in political debate. The influence of economic performance of the economy on political events is particularly important and pertinent in liberal democracies during election campaigns.

In formal terms, macroeconomics is the study of economic activity and prices in the overall economy of a nation or a region. Macroeconomic research draws heavily on microeconomics, which looks at the behaviour of individual firms, households, or markets.

In contrast, microeconomics involves study of the individual parts of the economy- rather than the economy as a whole- with respect to individual market prices, individual firm' revenues and cost of production and the employment of factors of production at the individual firm level.

1.2.1. The Process: Developing Macroeconomic Models

Macroeconomists try to explain how the overall economy works by using an economic theory, a logical framework to explain a particular economic phenomenon. Economic theory involves developing an economic model, a simplified representation of the economic phenomenon that takes a mathematical or graphical form. The development of an economic theory or model typically involves five steps :-

Identify an interesting economic question. For example, a macroeconomist might want to understand why the unemployment rate rises or falls over time, or why workers' wages in real terms (in terms of the goods and services they can actually buy) rise more rapidly during certain periods, but not others.

Specify the variables to be explained by the model, as well as the variables that explain them. A variable that a macroeconomist wants to explain is referred to as an endogenous variable, because it is explained inside the model he or she is building (and thus has the endo prefix). She would then identify a set of factors, called exogenous variables that are used to explain the endogenous variable, but are taken as given and thus are viewed as determined outside the model. (This is why they have the exo prefix.)

For example, in explaining the endogenous variable (the unemployment rate), the macroeconomist might specify consumer optimism or government spending as exogenous variables that are taken as given. Or if he or she were interested in explaining real wage growth, the endogenous variable, the macroeconomist might choose the rate of technological progress or the power of unions as the exogenous variables. The schematic diagram in Figure 1.1 illustrates the relationship between endogenous and exogenous variables in an economic model.

Posit a set of equations or graphical analysis to connect movements in the exogenous variables to the endogenous variables. For example, we might create a formula showing how, all else being equal, a 10% increase in government spending would change the unemployment rate. This formula is our model.

FIGURE 1.1
Variables in Macroeconomic Models
The model is a set of equations or a graphical analysis that explains movements in the endogenous variables—variables that are explained by the model—as a result of changes in the exogenous variables—given factors not determined by the model.

1. Compare the conclusions of the model with what actually happens. For example, if the model is designed to explain the unemployment rate, we would compare the model's predictions to actual unemployment data in prior years. If the conclusions do not match this historical data, return to step 2 and change the model.

2. If the data are well explained, use the model to make further predictions, say on where the unemployment rate will head a year from now and suggest policies to lower it.

The iterative process of comparing a model to actual data, making improvements along the way, raises new economic questions and advances knowledge in macroeconomics. We will look at the interaction of data and macroeconomic models as we proceed through this book, highlighting how the field of macroeconomics has evolved over time.

data series: real GDP, the unemployment rate, and the inflation rate. We look at each in turn.

1.2.2. The Purpose: Interpreting Macroeconomic Data

Macroeconomists, and in turn macroeconomic models, focus in particular on three economic data series: real GDP, the unemployment rate, and the inflation rate. We look at each in turn.

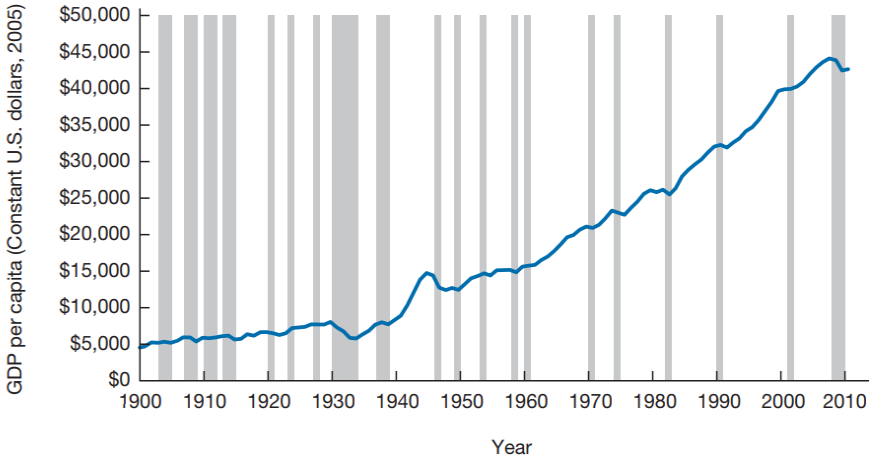
Real Gross Domestic Product (GDP) measures the output of actual goods and services produced in an economy over a fixed period, usually a year. As we will see in Chapter 2, real GDP also equals the total amount of real income of every person and firm in the economy.

Figure 1.2 shows real GDP per person in the U.S. economy from 1900–2010 and has two important attributes. (To account for changes in the purchasing power of a dollar, we treat all goods and services as if they were sold at prices from the year 2005.) First, notice in Figure 1.2 that real GDP per person has grown substantially over time. In 1900, the average U.S. person earned nearly $5,000. Today, this number has risen by more than a factor of eight, to around $40,000. U.S. citizens today have far more income than their great grandparents did, and have been getting richer and richer over time.

FIGURE 1.2

U.S. Real GDP Per Capita, 1900–2010

Due to business cycle fluctuations, real GDP per person has grown substantially but not smoothly, over time. We represent recessions with the shaded areas. Depressions are severe declines in real GDP, the most notable being the Great Depression (1929–1933).



Sources: Bureau of Economic Analysis. www.bea.gov/national/nipaweb/SelectTable.asp?Selected=N; and for data before 1929, Maddison, Angus. *Historical statistics*. http://www.ggdc.net/maddison/

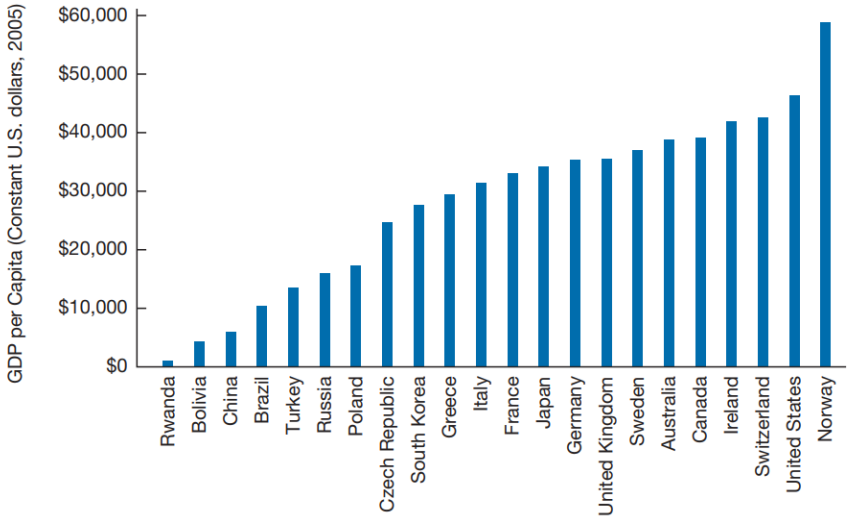
Second, notice in Figure 1.2 that real GDP grows unevenly over time and fluctuates around a trend. Fluctuations in real GDP are called a **business cycle**, which represents recurrent up and down movements in economic activity that differ in how regular they are. When economic activity declines and real GDP per person falls, there is a **recession**. In Figure 1.2, recession periods are marked by the shaded areas—and are frequent phenomena. When the decline in real GDP is severe, a recession is classified as a **depression**. The most notable of these is the Great Depression that lasted from 1929 until 1933. What causes recessions and particularly depressions is another of the most studied questions in macroeconomics.

So far we have only looked at real GDP per person in the United States. Figure 1.3 compares real GDP per person in a number of countries. As you can see, there are huge differences from country to country. Rwanda has a real GDP per person of just over $300, which is less than one-hundredth of U.S. real GDP. Macroeconomists study factors that affect real GDP over time. South Korea, for example, in 1960 had a real GDP per person of $1,500 that was actually lower than that of Bolivia. Today, Bolivia remains poor, while South Korea has moved into the rich countries' club, with its ranking of per person real GDP in the top quarter of all nations. South Korea turned around its prospects through very high economic growth rates.

FIGURE 1.3

Cross-Country Comparison of Real GDP per Capita in 2009

Real GDP per person varies widely across countries. Rwanda has a real GDP per person of under $400, which is less than one-hundredth of U.S. real GDP, which is over $40,000.



Source: World Bank. *World development indicators*. http://web.worldbank.org/WBSITE/

The unemployment rate measures the percentage of workers looking for work, but who do not have jobs, at a particular point in time. When unemployment is high, households suffer a loss of income and may even find themselves unable to meet basic needs for food and shelter.

Figure 1.4 shows the U.S. unemployment rate from 1929–2010. Notice that the unemployment rate always remains well above zero, indicating that even during good times, there is always some unemployment. In addition, in Figure 1.4 the unemployment rate fluctuates substantially and rises sharply during the shaded areas denoting recessions. In 1933 during the Great Depression, the unemployment rate climbed to 25%. The most recent recession starting in 2007, although not nearly as severe, still resulted in the largest rise in unemployment in the post–World War II period, with the unemployment rate rising by six percentage points, peaking at over 10%. What happens in labour markets to drive up unemployment during contractions in economic activity?

Figure 1.5 compares the average unemployment rates over the past decade for different countries. Poland's nearly 16% unemployment rate is more than four times that of Norway, indicating the wide variation across countries. We will study the characteristics of labour markets that lead to high average unemployment rates in some countries.

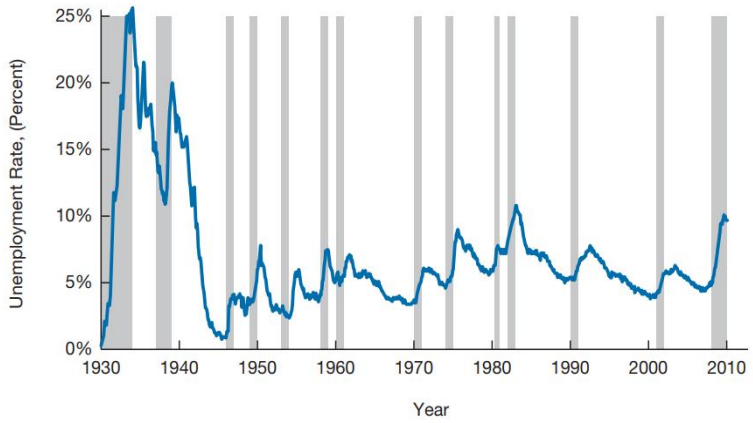
Inflation or the **inflation rate** tells us how rapidly the overall level of prices is rising. Notice in Figure 1.6 that up until World War II, the inflation rate was on average about zero, and was often negative, a situation referred to as deflation. In the late 1960s, inflation rose and remained

quite high for an extended period of time through the early 1980s, a period economists often refer to as the Great Inflation.

FIGURE 1.4

U.S. Unemployment Rate, 1929–2010

The unemployment rate always remains well above zero and has substantial fluctuations and rises sharply during recessions, denoted by the shaded areas.

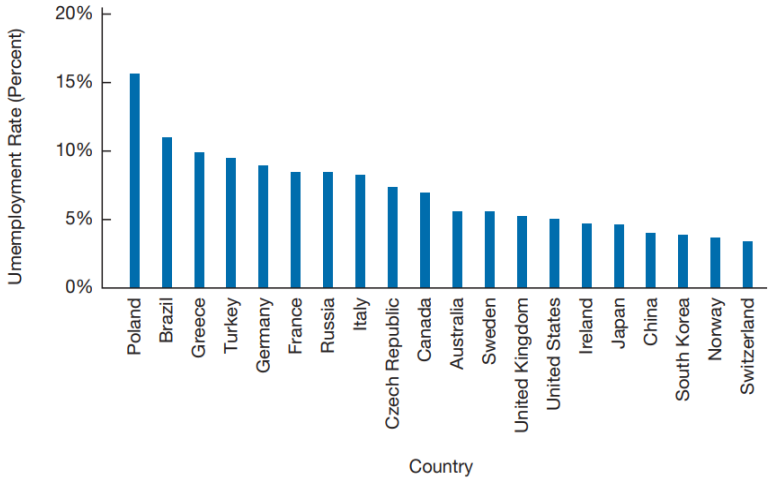


Sources: Bureau of Labor Statistics. http://data.bls.gov/cgi-bin/surveymost?ln; and data prior to 1948, National Bureau of Economic Research. *Macro history database, income and employment*. www.nber.org/databases/macrohistory/contents/chapter08.html

FIGURE 1.5

Cross-Country Comparison of Average Unemployment Rates, 2000–2010

The average unemployment rates over the past decade for a number of countries show much variation. For example, Poland's 15.7% unemployment rate is more than four times higher than Norway's 3.6% unemployment rate.



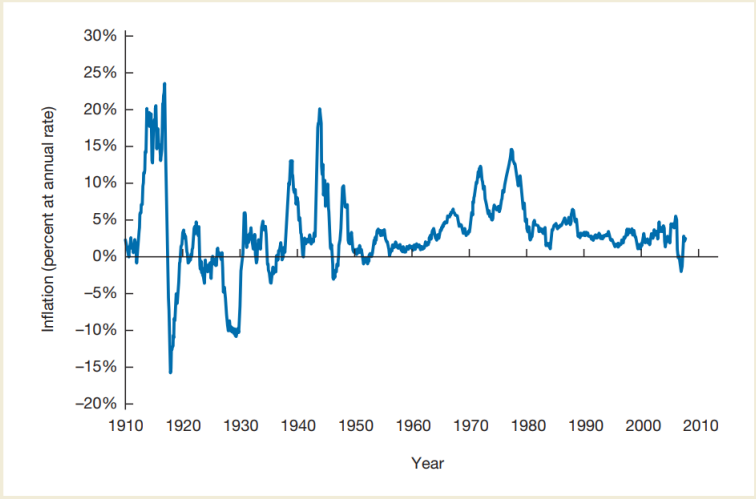
Source: International Monetary Fund. *International financial statistics*. www.imfstatistics.org/imf/

A changing price level complicates decision making for consumers, businesses, and government, and this uncertainty can hamper economic growth. Consider a shop owner who finds that he or she can raise prices and make more profit. The owner might conclude that demand for his or her goods is rising and invest in expanding the store. If the overall price level is rising and demand for his or her goods hasn't changed, the decision to expand the shop could backfire.

FIGURE 1.6

U.S. Inflation Rate, 1914–2010

Up until World War II, the average inflation rate was near zero. In the late 1960s, inflation rose and remained quite high for an extended period of time through the early 1980s, the period of the Great Inflation.

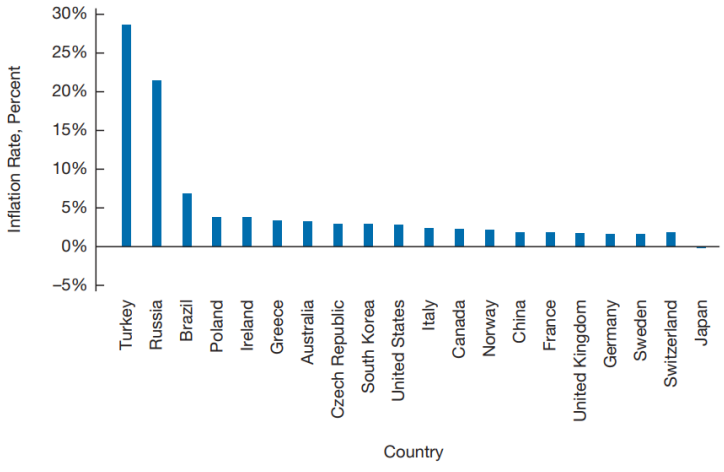


Source: Bureau of Labor Statistics. http://data.bls.gov/cgi-bin/surveymost?cu

FIGURE 1.7

Cross-Country Comparison of Average Inflation Rates, 2000–2010

Countries' average inflation rates over the past decade have differed, with most countries having inflation rates averaging less than 5% at an annual rate, but some, such as Turkey and Russia, with inflation rates well above that.



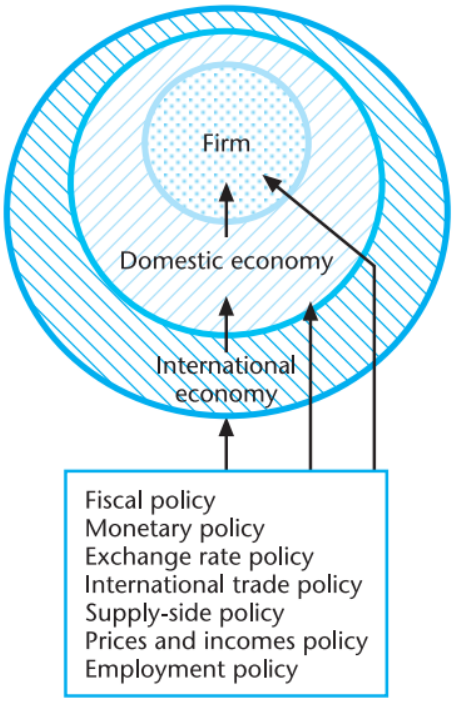
Source: International Monetary Fund. *International financial statistics*. www.imfstatistics.org/imf/

Figure 1.7 shows that the average inflation rates over the past decade for a number of countries have differed substantially. What makes some countries more prone to inflation than others? Some countries have experienced super high inflation rates, which we refer to as hyperinflation. Zimbabwe (not shown in the figure) is the most recent extreme example with its inflation rate soaring to over two million percent at an annual rate.

1.3. THE MACROECONOMY AND BUSINESS CYCLE

The success or failure of business is to large extent, depending upon how its managers perform in terms of financial controls, market strategies, product design and research and development, etc. A great deal of time and effort is spent by successful firms in ensuring that right decisions are made in competitive environment with greatest attention being paid to the immediate environment in which firms are operating- to the workforce, to the production line, to the marketplace for products to direct competitors. This immediate environment is described as microeconomic environment of firm that involves firm 'prices, revenue, cost, employment levels and so on.

In contrast to microeconomy, this refers to which is external to immediate environment of firm and involve changes in general inflation and employment.



The macroeconomy and business

1.4. MACROECONOMIC POLICIES

The economy policies options available to governments including (central banks) are summarised below:-

1. **Fiscal Policy-** It is concerned with composition of and changes in the level of government expenditure and taxation.
2. **Monetary Policy -** It is defined as measures taken by government and central banks to influence the cost of borrowing (rate of interest) and availability of credit and liquidity in the economy that affects the overall demand and supply side of economy.
3. **Exchange rate policy –** It refers to government and central bank intervention in foreign exchange markets to influence the level and direction of external' value of country' currency.
4. **International trade policy –** It refers to measures taken by government, in addition to exchange rate policy to influence the magnitude and direction of foreign trade.
5. **Supply side policy –** It refers to measures taken by government that are directed at tackling problems that involving the growth and sustainability of nation' total or aggregate supply of goods and services in the economy over time.
6. **Prices and income policies –** It refers to direct intervention of government in the working of market economy concerned with setting of prices of goods and services and wage settlements.
7. **Employment policy –** It refers to government effort to create jobs and reduce unemployment.

1.4.1 Major Macroeconomic Issues

1. Employment and Unemployment

The major issue in macroeconomics is to explain what determines the level of employment and national income in an economy. Unemployment refers to the involuntary idleness of resources including labour. If this problem exists society's actual output (GNP) will be less than its potential output. So one of the objectives of the government is to ensure full employment, which implies an absence of involuntary unemployment. Thus, the macroeconomic issue is what causes involuntary unemployment.

Classical economists denied that there could be involuntary unemployment of labour and other resources for a long time. They thought that with the flexible wage rates and interest rates, unemployment would be automatically removed and full employment established. But this did not appear to be so at the time of depression in the thirties.

Keynes explained that the level of employment and national income is determined by aggregate demand and aggregate supply. According to him, with the aggregate supply

remaining unchanged in the short run, it is the deficiency in aggregate demand that causes unemployment in the economy.

2. Inflation or Rising General Price Level

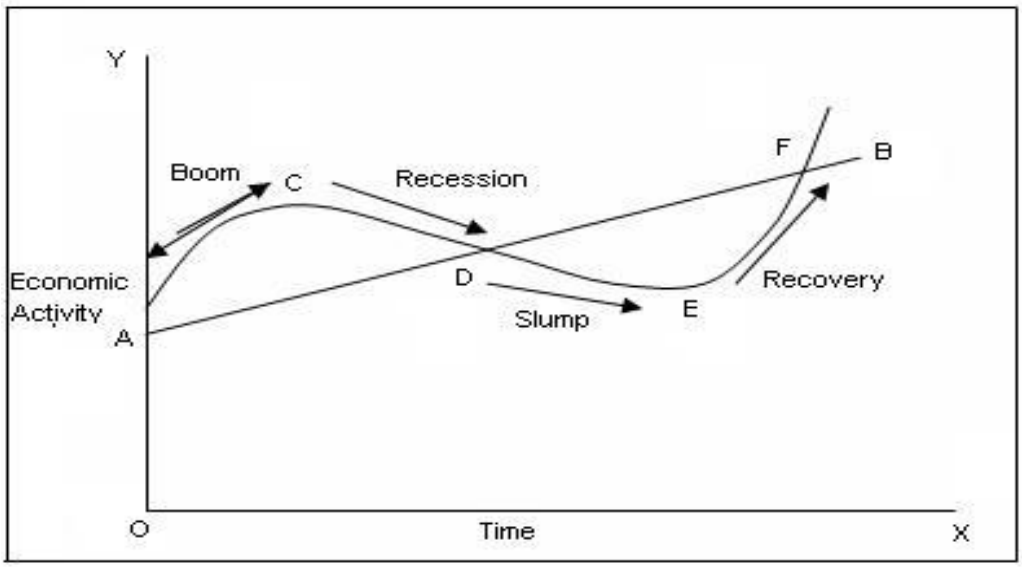
Another issue of macroeconomic issues is to explain and analysis the problem of inflation faced by both developed and developing countries. It refers to a phenomenon of persistent rise in the price level. During inflation, some people gain but most people lose. Therefore, one of the objectives of the government is to ensure stability at the price level.

Classical economists thought that it is the quantity of money that determines the price level. According to them, the rate of inflation depends on the growth of the money supply in the economy.

But Keynes criticized the quantity theory of money and explained his own theory of inflation. According to him, just as unemployment is caused by the deficiency of aggregate demand, inflation is due to excessive aggregate demand.

3. Business Cycles

Throughout the history of economics, market economies have experienced what are called business cycles. Business cycles refer to the fluctuations in output and employment with alternating periods of prosperity and depression. The causes of these business cycles in the market economies are an important market economic issue. So in macroeconomics, we study the causes of business cycles and suggest remedial measures.



4. Stagflation and Deflation

Stagflation refers to a situation when a high rate of inflation occurs simultaneously with a high rate of unemployment. The existence of a high rate of unemployment means a reduced level of GNP. The term stagflation was coined in the 70s when several developed countries of the world, received a supply shock in terms of capsid hikes in oil prices. It is one of the important macroeconomic issues of the day perhaps the most complex. This problem could not explain with the Keynesian theory of effective demand (demand-side analysis). Therefore, a new economic thought emerged which is called supply-side economies. Every country in the world is struggling hard to fight this issue.

During the decade of 1930s market economies have experienced a greater economic problem, which has been described as depression or deflationary pressure. Deflation is a phenomenon of falling prices. In other words, deflation is the state of the economy where the value of money is rising or the prices are falling.

5. Economic Growth

Another important issue of macroeconomic issues is to explain what determines economic growth in a country. The problem of growth is a long-run problem, which Keynes did not take into consideration.

The expansionary trend in the country's total output over a long period is known as economic growth. Growth is measured by the annual rate of increase of per capita income. It refers to a situation when the rate of increase in per capita income exceeds the rate of population growth. There are many theories and models on economic growth that explain how the steady growth of the economy can be achieved.

These theories also explain the causes of underemployment and poverty in less developed countries and they suggest the policies and strategies for accelerating growth in them.

6. Balance of Payments and Exchange Rate

Balance of Payments (BOP) is the systematic record of all economic transactions of the residents of a country with the rest of the world during the period. There may be a deficit or surplus in a BOP. Both create problems in the economy. The transactions in the BOP are influenced by the rate of exchange.

The exchange rate is the rate at which a country's currency is exchanged for foreign currencies. The instability in the foreign exchange rate is a major problem, which creates serious BOP problems. Economists are always eager to discover the cause and

effect of changes in a BOP. Thus, the equilibrium in BOP position and stability in the exchange rate are important macroeconomic issues.

1.5. THE ROLE OF ECONOMIC THEORY AND CONTROVERSY

1. An understanding by government policy makers of the factors which determine the long-run growth of an economy and the short-run fluctuations that constitute the business cycle is essential in order to design and implement economic policies which have the potential vastly to improve economic welfare.
2. The primary aim of macroeconomic research is to develop as comprehensive an understanding as possible of the way the economy functions and how it is likely to react to specific policies and the wide variety of demand and supply shocks which can cause instability.
3. Macroeconomic theory, consisting of a set of views about the way the economy operates, organized within a logical framework (or theory), forms the basis upon which economic policy is designed and implemented. Theories, by definition, are simplifications of reality.
4. Accordingly, explicit or implicit models are necessary to make sense of a very complex world. By definition economic theories and specific models act as the laboratories we otherwise lack in the social sciences.
5. They help economists decide what are the important factors that need to be analysed when they run thought experiments about the causes and consequences of various economic phenomena.
6. A successful theory will enable economists to make better predictions about the consequences of alternative courses of action thereby indicating the policy regime most likely to achieve society's chosen objectives.
7. The design of coherent economic policies aimed at achieving an acceptable rate of economic growth and reduced aggregate instability depends then on the availability of internally consistent theoretical models of the economy which can explain satisfactorily the behaviour of the main macro variables and are not rejected by the available empirical evidence.
8. The knowledge that macroeconomists have today about the way that economies function is the result of a prolonged research effort often involving intense controversy and an ever-increasing data bank of experience.

IN-TEXT QUESTIONS

Q1. Economic Growth, unemployment and inflation – Discuss the three primary concerns in Macroeconomics?

Q2. Give two examples of macroeconomic studies?

Q3. Give five variables of macroeconomics?

1.6. OBJECTIVES, INSTRUMENTS AND THE ROLE OF GOVERNMENT

- In our historical journey we will see that macroeconomics has experienced periods of crisis. There is no denying the significant conflicts of opinion that exist between the different schools of thought, and this was especially evident during the 1970s and 1980s.
- The choice of appropriate instruments in order to achieve the 'major goals' of economic policy will depend on a detailed analysis of the causes of specific macroeconomic problems.
- Here we encounter two main intellectual traditions in macroeconomics which we can define broadly as the classical and Keynesian approaches.
- The extent and form of government intervention in the economy was a major concern of Adam Smith (1776) in the Wealth of Nations, and the rejection of uncontrolled laissez-faire by Keynes is well documented.
- During the twentieth century the really big questions in macroeconomics revolved around this issue. Mankiw (1989) identifies the classical approach as one 'emphasising the optimization of private actors' and 'the efficiency of unfettered markets'.
- On the other hand, the Keynesian school 'believes that understanding economic fluctuations requires not just the intricacies of general equilibrium, but also appreciating the possibility of market failure'.
- Despite the development of more sophisticated and quantitatively powerful techniques during the past half-century, these two basic views identified by Keynes have persisted.
- The new generation of macroeconomists generally accepted Keynes's central message that a laissez-faire capitalist economy could possess equilibria characterized by excessive involuntary unemployment.
- The main policy message to come out of the General Theory was that active government intervention in order to regulate aggregate demand was necessary, indeed

unavoidable, if a satisfactory level of aggregate output and employment were to be maintained.

- Although, as Skidelsky (1996a) points out, Keynes does not deal explicitly with the Great Depression in the General Theory, it is certain that this major work was written as a direct response to the cataclysmic events unfolding across the capitalist economies after 1929.

1.6.1 Objective of Macroeconomic Policies

Monetary policy, and macroeconomic policy in general, has two primary objectives: stabilizing economic activity and stabilizing inflation around a low level.

A. Stabilizing Economic Activity

There are two primary reasons: (1) high unemployment causes much human misery, and (2) high unemployment leaves workers, factories, and other resources idle, reducing output.

If unemployment is such a negative force in the economy, should policy makers target a zero rate of unemployment, when no worker is out of a job? In fact, the economy is better off with a small level of **frictional unemployment**, which occurs because workers and firms need time to make suitable matchups. One undesirable but perpetual source of unemployment is **structural unemployment**, a mismatch between job requirements and the skills or availability of local workers. Monetary policy has limited impact on both frictional and structural unemployment.

Policy makers target an unemployment rate above zero that is consistent with the maximum sustainable level of employment at which there is no tendency for inflation to increase. This level is called the natural rate of unemployment.

Identifying the natural rate of unemployment is not as straightforward as it might seem. Clearly, an unemployment rate of more than 20%, like that seen in the Great Depression, is too high. But is 4% too low? In the 1960s, policy makers achieved a 4% unemployment rate but also set off accelerating inflation. Currently, most economists believe the natural rate of unemployment is around 5%, but this estimate is subject to much uncertainty and disagreement. Also, the natural rate can change over time. A government program that spreads information about job vacancies and training programs, for example, might reduce structural unemployment, lowering the natural unemployment rate.

In general terms, achieving the natural rate of unemployment is equivalent to stabilizing the economy. At the natural rate of unemployment, the economy moves to its natural rate of output, which we refer to more commonly as potential output. To achieve maximum sustainable employment, output (Y) must move closer to potential output (YP), so that the output gap

stabilizes around zero. Monetary policy that stabilizes unemployment around the natural rate of unemployment will also stabilize output around potential output, which is what we refer to as stabilizing economic activity.

B. Stabilizing Inflation: Price Stability

A growing body of evidence suggests that high inflation, which is always accompanied by high variability of inflation, reduces economic growth and strains society. Consumers, businesses, and governments struggle to interpret the information conveyed by rapidly changing prices of goods and services. Parents find it more difficult to plan for the cost of a child's education. Public opinion toward inflation turns hostile, and society splinters as segments of the population strain to keep up with the rising level of prices.

Over the past few decades, greater awareness of these costs has increased the number of central banks that pursue a policy of **price stability**—defined as low and stable inflation— as the central monetary policy goal. Central banks must set inflation objectives with great care: aiming for zero inflation increases the risk of negative inflation, or deflation, which introduces pernicious problems of its own.

Central banks pursue a price stability objective with a goal of maintaining inflation, , close to a target level , referred to as an inflation target, that is slightly above zero. Most central banks set between 1% and 3%. An alternative way to think about the price stability objective is that monetary policy should try to minimize the difference between inflation and the inflation target, which we refer to as the inflation gap.

1.7 SUMMARY

Macroeconomics is the study of the economy as a whole, including growth in incomes, changes in prices, and the rate of unemployment. Macroeconomists attempt both to explain economic events and to devise policies to improve economic performance.

To understand the economy, economists use models—theories that simplify reality in order to reveal how exogenous variables influence endogenous variables. The art in the science of economics is in judging whether a

A key feature of a macroeconomic model is whether it assumes that prices are flexible or sticky. According to most macroeconomists, models with flexible prices describe the economy in the long run, whereas models with sticky prices offer a better description of the economy in the short run.

Microeconomics is the study of how firms and individuals make decisions and how these decisionmakers interact. Because macroeconomic events arise from many microeconomic interactions, all macroeconomic models must be consistent with microeconomic foundations, even if those foundations are only implicit.

1.8 ANSWER TO IN-TEXT QUESTIONS

1. The three primary concerns in macroeconomic analysis are:
   (a) Economic growth : The increase in the value of products and services generated in a country during a fiscal year after removing the effect of inflation is termed as economic growth. The proportional rise in real GDP is used to quantify economic growth.
   (b) Unemployment: Unemployment is when an individual constantly tries to find a job but cannot obtain the same. It is regarded as one of the most important indicators of economic strength. As, when the economic growth slows the unemployment rate rises.
   (c) Inflation is defined as a general rise in the selling price of an item. The overall increase in the price level of a commodity is referred to as inflation.
2. Following are the two examples of macroeconomic studies:
   (a) Study of national income
   (b) Study of employment rate
3. (a) Theory of income and employment (b) Theory of money (c) Trade cycle (d) Macro theory of distribution (e) Growth Economics

1.9 SELF-ASSESSMENT QUESTIONS

1. What is a business cycle? How does the unemployment rate behave over the course of a business cycle? Does the unemployment rate ever reach zero?
2. Define inflation and deflation. Compare the behaviour of consumer prices before and after world war II. And testing an economic theory an
3. What is stagflation and when did it occur? How did it change economists views about macroeconomics?
4. What steps are involved in developing and testing an economic theory or model? What are the criteria for a useful theory or model.

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LESSON-2

NATIONAL INCOME ACCOUNTING AND CONCEPTS OF GDP AND NATIONAL INCOME; MEASUREMENT OF NATIONAL INCOME AND RELATED AGGREGATES

STRUCTURE

2.1 LEARNING OBJECTIVES

After reading this chapter you will be familiar with the following topics.

1. Importance of National Income Accounting
2. Concept of GDP and National Income
3. Different methods of measurement of National income and related aggregates.

2.2 INTRODUCTION

After reading this chapter you will be familiar with the concept of National Income and its constituents. Certain important concepts such as residents, domestic territory, intermediate goods, Market price and factor Income, Depreciation, etc. The three most widely used methods of calculation of national income have been used in the calculation of national income i.e. Value added method, Income method, and Expenditure method.

2.3 NATIONAL INCOME AND ITS CONCEPT

National income is the total value of goods and services produced within the national boundaries of a country. National income is the factor income earned by the residents during an accounting year. It is represented by NNP_{FC}. It is the income earned by the normal residents of the nation.

Normal residents are those residents who reside in the domestic territory of the nation and those who carry out their economic activities in the domestic territories.

The following are not regarded as normal residents.

1. Foreign tourists and visitors are not included as normal residents.
2. Foreign staff, embassies, officials, and members of armed forces of foreign countries.
3. International organizations such as WHO, UN, and WTO are treated as normal residents of international areas. If employees work in an international organization for more than one year then they become normal residents of the country in which the office of an international organization is located.
4. Crew members of foreign vessels, and commercial travellers if they are located for less than one year.
5. Border workers are considered normal residents of the country where they live and not of the country where they work.

Domestic territory or the economic territory of the country includes:

1. Ships and aircraft owned and operated by the normal residents between any two countries are treated as the domestic territory of the owner country.
2. Embassies, consulates, and military establishments of a country located abroad. For example, the Indian embassy in Australia is the domestic territory of India.
3. Fishing vessels, oil, and natural gas rigs operated by the residents of the country in international waters have the exclusive rights of operation.

The domestic territory doesn't include:

1. Foreign embassies, officials, and members of armed forces of foreign countries.

2. International organizations such as WHO, UN, and WTO are treated as normal residents of international area

2.4 INCOME AGGREGATES

There is various aggregate to measure the Income in the country such as GDP at MP, GGDP at FC, NNP at FC, NNP at MP, NDP at MP, and NDP at FC. So, to understand all these terminologies there is a need to learn about Depreciation, Net indirect taxes, and Net Factor income from abroad.

Gross National Product (GNP): Gross national product gives the market value of all final goods and services produced by nationals. The entire value of products and services generated by a nation's citizens, regardless of where they are in the globe, is measured by GNP.

GDP measures the total value of final goods and services, regardless of whether they were created by natives or foreigners, a country's GDP counts the total value of products and services generated inside its boundaries. It exclusively considers economic activities that occur within a nation's borders

In simple words, GDP tracks economic activity inside a nation's boundaries, whereas GNP tracks all of that nation's residents' economic activity, wherever they may be. GNP is not as frequently utilized in practice.

GNP = GDP + (Factor Income from Abroad - Factor Income to Abroad)

Factor Income from Abroad refers to the income earned by a country's citizens from wages, rent, investments, and retained earnings of the resident companies working in other countries.

Factor Income Abroad refers to the income earned by foreigners from investments or work done within a country's borders.

NFIA(Net factor Income from Abroad) = Factor Income from Abroad - Factor Income to Abroad.

Gross National Product (GNP) measures the Gross value of goods and services produced by a country's citizens, regardless of where they are located in the world.

Net National Product (NNP) also measures the Net value of goods and services produced by countries' citizens.

The main difference between GNP and NNP is Depreciation. NNP measures the value of a country's national income after accounting for depreciation or wear and tear on the country's capital goods.

Gross-Net=Depreciation

To calculate NNP, we subtract depreciation from the GNP. Depreciation refers to the reduction in the value of capital goods over time due to wear and tear or obsolescence. By subtracting depreciation, we can obtain a measure of a country's net income from its economic activities, after accounting for the loss of value of its capital stock.

GDP at Market Prices and GDP at Factor Cost

There are two ways to measure GDP: at market prices and factor cost.

GDP at market prices, also known as nominal GDP, measures the value of all final goods and services produced in a country during a given period, using the prices prevailing in the market. It includes the value of indirect taxes and excludes subsidies.

On the other hand, GDP at factor cost, also known as real GDP, measures the value of all final goods and services produced in a country during a given period, using the prices of factors of production (such as labor and capital) that are used in the production process. It excludes the value of indirect taxes and includes subsidies.

$$GDP_{MP} = GDP_{FC} + Net\ Indirect\ Taxes$$

$$Net\ Indirect\ taxes\ =\ Indirect\ Taxes - Subsidies$$

The difference between GDP at market prices and GDP at factor cost is the indirect taxes and subsidies. Indirect taxes are taxes on goods and services that are included in their prices, while subsidies are payments made by the government to support certain industries or products.

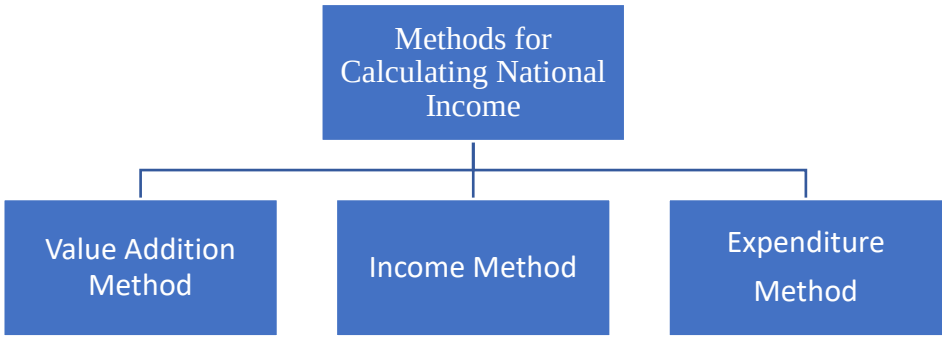
IN-TEXT QUESTION

1. What do you mean by Domestic territory?
2. From the following information calculate GDP at MP, NNP at FC

NDP at MP	12000
Net indirect Taxes	5678
Current account transfers to households	2305
Depreciation	9654
Net Factor income from abroad	-250

2.5 METHODS OF ESTIMATING NATIONAL INCOME

Three important methods for the calculation of national income are represented graphically as follows:



Value Addition Method incorporates the contribution of the enterprises in the value generation process. It is calculated as the difference between the value of output and the value of intermediate goods. Intermediate goods include those goods which are used for resale or utilized for further production in the same year. For example, Milk was purchased by the dairy shop to produce sweets and buttermilk.

Steps to obtain national income by the value-added method

1. Value added = value of output- Intermediate consumption

   Value of output= sales + change in stock

   Change in stock = Closing Stock- Opening Stock
2. Classifying the production enterprises into primary, secondary, and tertiary sectors.
3. The summation of gross value added at a market price of all the sectors gives the Gross Domestic Product at Market Price.
4. National Income= NNP_{FC}= $GDP_{MP} - Depreciation - Net\ Indirect\ Taxes + NFIA(\ Net\ factor\ Income\ from\ Abroad)$
5. So, we get the National income at factor cost through the value-added method.

Precautions while using the Value addition Method of National Income:

1. Intermediate goods should not be included while calculating National Income.
2. The sale and purchase of second-hand goods should not be included while calculating national income.
3. Production of services for self-consumption is not Included in the calculation of national income such as services of housewives, and kitchen gardening are not included in the calculation of national income.
4. The imputed value of the Production of goods for self-consumption will be included in the national income.

Income Method of Estimating National Income

The components of the Income Method are as follows:

1. Compensation of Employees which includes wages and salaries in cash and kind.
2. Rent and Royalties
3. Interest
4. Profits
5. Mixed-Income

Steps to compute National Income by Income Method

1. Classify the factors of income in the different sectors of the economy, i.e. primary, secondary, and tertiary.
2. Estimate the factor income paid by each sector
3. NDP_{FC}= compensation of employees+ Rent and Royalty+Interest+Profit+Mixed Income
4. $NNP_{FC} = NDP_{FC} + NFIA$

Hence National Income by income Method is calculated.

Precaution of National income by Income Method

1. Income from the sale of second-hand goods should not be included in the estimation of national income.
2. Income from the sale of bonds, shares, and debentures should not be included.
3. Transfer Income should not be included in the estimation of national income as they do not lead to any productive activity.

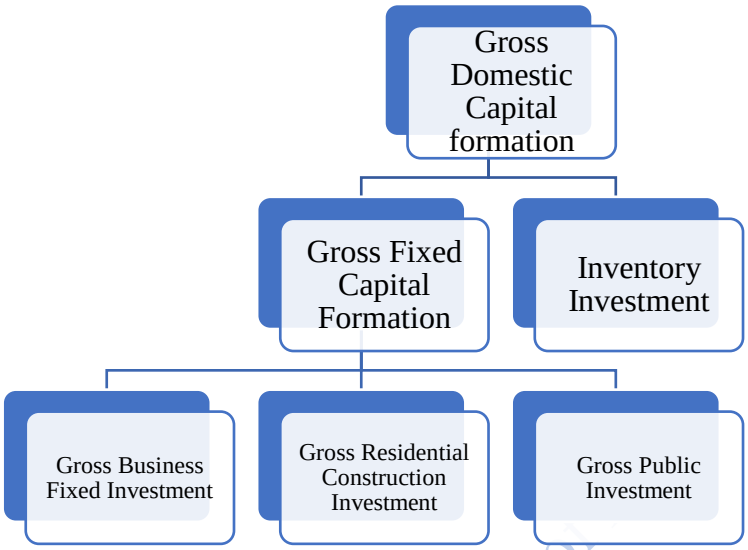
Expenditure Method

Income earned by the different factors of production is spent on purchasing goods and services. This total final expenditure is equal to the gross domestic product at market price. The expenditure method is also known as the income disposal method.

The components of the Expenditure method are as follows:

1. Private Final Consumption Expenditure(PFCE): the amount spent by households on goods and services, including durable goods (such as cars and appliances), nondurable goods (such as food and clothing), and services (such as healthcare and education).
2. Government Final Consumption Expenditure (GFCE): This includes the amount spent by the government on goods and services, such as infrastructure, defense, and public administration.
3. Gross domestic Capital formation or Gross Investment(GDCF): This includes the amount spent by businesses on fixed assets, such as buildings, machinery, and equipment, as well as on inventories and research and development.

   There are two components of Gross Domestic Capital formation.



4. Net Export (X-M): It is the difference between export and Import.

Steps to compute National Income by Expenditure Method

1. Classify economic units incurring Final Expenditure such as households, government, producing sector, and rest of the world.
2. The sum of the components of the final expenditure gives gross domestic product at market prices

$$GDP_{MP} = PFCE + GFCE + GDCF + (X - M)$$

3. Calculating National Income
   $NNP_{FC} = GDP_{MP} - Depreciation - Net\ Indirect\ Taxes + NFIA(\ Net\ factor\ Income\ from\ Abroad)$

Precaution from Expenditure method

1. Transfer payment should not be included in the national income.
2. The purchase of second-hand goods should not be included in the national income.
3. Expenditure on intermediate goods will not be included in the national income.
4. The purchase of financial assets will not be included in the estimation of national income.

IN-TEXT QUESTION

3. Question. Suppose the GDP at MP of a country in a particular year was Rs. 1400 crore, and Net Factor Income from abroad was Rs. 200 crores. The value of Net Indirect taxes was Rs. 100 crore and the National income was Rs. 900 crore. Calculate the aggregate value of depreciation.
4. Calculate sales from the following data in (crores):

I.	Net value added at FC	600
II.	Intermediate Consumption	500
III.	Indirect tax	40
IV.	Changes in stocks	-200
V.	Depreciation	60

2.6 SUMMARY

National income is the sum of the income earned by the normal residents of the country. There are three methods for calculating national income and these are used as per the availability of data and to serve the particular purpose of calculating the national income. For example value, the added method gives a clear picture of the contribution to the national income by the particular sector of the economy. Income methods help to ascertain the inequality in wealth distribution in the country, whereas the expenditure method helps in revealing the standard of living of people by revealing their consumption patterns. These three methods are summarized as follows:

Value Added Method	Income Method	Expenditure Method
GVA at MP	Compensation of employees	Private Final Consumption Expenditure
-Depreciation	+Rent	Government Final consumption Expenditure
-Net Indirect Taxes	+Interest	Gross Domestic Capital Formation
+NFIA	+Profits	+Net Export
	+Mixed Income	-Net Indirect taxes
	+NFIA	-Depreciation
		+NFIA

=NNP at FC	=NNP at FC	=NNP at FC

2.7 ANSWERS TO INTEXT QUESTIONS

1. Domestic territory is the territory administered by the government. Income generated in the domestic boundaries is called domestic income.
2. To Calculate GDP at MP and NNP_{FC}

$$GDP_{MP} = NDP_{MP} + Depreciation$$

$$GDP_{MP} = 12000 + 9654$$

$$GDP_{MP} = 21654$$

$$NNP_{FC} = NDP_{MP} - Net\ Indirect\ Taxes$$

$$NNP_{FC} = 12000 - 5678$$

$$NNP_{FC} = 6322$$

3. GDP at MP = National Income – Net factor Income from abroad +Net indirect tax +depreciation

   1400= 900-200+100+Depreciation

   Depreciation = Rs. 600 crore

4. Gross value added at MP = sales +Changes in stocks-Intermediate consumption

   Sales = GVA at MP- changes in stocks +Intermediate consumption

   Sales = (600+60+40)-(-200)+500

   Sales = 1400 crore

2.8 SELF ASSESSMENT QUESTIONS

1. Calculate sales from the following data in (crores):

I.	Consumption of fixed capital	100
II.	Closing stock	90
III.	Private final consumption expenditure	500
IV.	Opening stock	70
V.	Net factor income from abroad	-(40)
VI.	Exports	25

VII.	Government final Consumption expenditure	250
VIII.	Imports	60
IX.	Net Indirect Tax	150
X.	Net Domestic Capital Formation	400

3. Calculate GNP at MP by income method (Rs. In crore)

I.	Compensation of employees	600
II.	Private final consumption Expenditure	190
III.	Rent	50
IV.	Profits	170
V.	Net factor income from abroad	-(40)
VI.	Net Exports	25
VII.	Government final Consumption expenditure	250
VIII.	Interests	60
IX.	Net Indirect Tax	30
X.	Change in stocks	150
XI.	Mixed income	400

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LESSON – 3

NOMINAL AND REAL INCOME

STRUCTURE

3.1 LEARNING OBJECTIVE

This lesson introduces the basic difference between the nominal and real GDP and also focuses on the three most important methods of calculating GDP namely – The income method, expenditure method and the value added method. Also, it emphasis on the limitation and the challenges faced by the individual while calculating the gross domestic product of a nation.

After going through this lesson, you should be able to explain:

- The meaning and objective of national income accounting in economic stability
- The calculation of all the three methods of calculating GDP
- The difference between the nominal and real income
- Helps to determine the limitation of GDP and its way forward

3.2 INTRODUCTION

Taken broadly, fiscal policy involves decisions about government spending and taxation. The government's budget reflects both outlays (in the form of government spending) and income (in the form of tax revenue).

Fiscal policy is defined as the policy under which the government uses the instrument of taxation, public spending and public borrowing to achieve various objectives of economic policy. Simply put, it is the policy of government spending and taxation to achieve sustainable growth.

Economists studying economic activity in the nineteenth century or during the Great Depression had no measure of aggregate activity (aggregate is the word macroeconomists use for total) on which to rely. They had to put together bits and pieces of information, such as the shipments of iron ore or sales at some department stores, to try to infer what was happening to the economy as a whole.

It was not until the end of World War II that national income and product accounts (or national income accounts, for short) were put together. Measures of aggregate output have been published on a regular basis in the United States since October 1947. (You will find measures of aggregate output for earlier times, but these have been constructed retrospectively.)

Like any accounting system, the national income accounts first define concepts and then construct measures corresponding to these concepts. You need only to look at statistics from countries that have not yet developed such accounts to realize that precision and consistency in such accounts are crucial. Without precision and consistency, numbers that should add up do not; trying to understand what is going on feels like trying to balance someone else's check book. We shall not burden you with the details of national income accounting here. But because you will occasionally need to know the definition of a variable and how variables relate to each other, Appendix 1 at the end of the book gives you the basic accounting framework used in the United States (and, with minor variations, in most other countries) today. You will find it useful whenever you want to look at economic data on your own.

3.2.1 GDP: Production and Income

The measure of aggregate output in the national income accounts is called the gross domestic product, or GDP, for short. To understand how GDP is constructed, it is best to work with a simple example. Consider an economy composed of just two firms:

- Firm 1 produces steel, employing workers and using machines to produce the steel. It sells the steel for $100 to Firm 2, which produces cars. Firm 1 pays its workers $80, leaving $20 in profit to the firm.

- Firm 2 buys the steel and uses it, together with workers and machines, to produce cars. Revenues from car sales are $200. Of the $200, $100 goes to pay for steel and $70 goes to workers in the firm, leaving $30 in profit to the firm.

  We can summarize this information in a table:

Steel Company (Firm 1)			Car Company (Firm 2)		
Revenues from sales		$100	Revenues from sales		$200
Expenses		$80	Expenses		$170
Wages	$80		Wages	$70	
			Steel purchases	$100	
Profit		$20	Profit		$30

How would you define aggregate output in this economy? As the sum of the values of all goods produced in the economy—the sum of $100 from the production of steel and $200 from the production of cars, so $300? Or as just the value of cars, which is equal to $200?

Some thought suggests that the right answer must be $200. Why? Because steel is an **intermediate good**: It is used in the production of cars. Once we count the production of cars, we do not want to count the production of the goods that went into the production of these cars.

This motivates the first definition of GDP:

1. GDP Is the Value of the Final Goods and Services Produced in the Economy during a Given Period:-

The important word here is final. We want to count only the production of final goods, not intermediate goods. Using our example, we can make this point in another way. Suppose the two firms merged, so that the sale of steel took place inside the new firm and was no longer recorded. The accounts of the new firm would be given by the following table:

Steel and Car Company	
Revenues from sales	$200
Expenses (wages)	$150
Profit	$50

All we would see would be one firm selling cars for $200, paying workers $80 + $70 = $150, and making $20 + $30 = $50 in profits. The $200 measure would remain unchanged—as it should. We do not want our measure of aggregate output to depend on whether firms decide to merge or not.

This first definition gives us one way to construct GDP: by recording and adding up the production of all final goods—and this is indeed roughly the way actual GDP numbers are put together.

2. GDP Is the Sum of Value Added in the Economy during a Given Period:-

The term value added means exactly what it suggests. The value added by a firm is defined as the value of its production minus the value of the intermediate goods used in production.

In our two-firms example, the steel company does not use intermediate goods. Its value added is simply equal to the value of the steel it produces, $100. The car company, however, uses steel as an intermediate good. Thus, the value added by the car company is equal to the value of the cars it produces minus the value of the steel it uses in production, $200 - $100 = $100. Total value added in the economy, or GDP, equals $100 + $100 = $200. (Note that aggregate value added would remain the same if the steel and car firms merged and became a single firm. In this case, we would not observe intermediate goods at all—as steel would be produced and then used to produce cars within the single firm—and the value added in the single firm would simply be equal to the value of cars, $200.)

This definition gives us a second way of thinking about GDP. Put together, the two definitions imply that the value of final goods and services—the first definition of GDP—can also be thought of as the sum of the value added by all the firms in the economy—the second definition of GDP.

So far, we have looked at GDP from the production side. The other way of looking at GDP is from the income side. Go back to our example and think about the revenues left to a firm after it has paid for its intermediate goods: Some of the revenues go to pay workers—this component is called labour income. The rest goes to the firm—that component is called capital income or profit income.

Of the $100 of value added by the steel manufacturer, $80 goes to workers (labour income) and the remaining $20 goes to the firm (capital income). Of the $100 of value added by the car manufacturer, $70 goes to labour income and $30 to capital income. For the economy as a whole, labour income is equal to $150 1 $80 + $702, capital

income is equal to $50 1$20 + $302. Value added is equal to the sum of labour income and capital income is equal to $200 1$150 + $502.

This motivates the third definition of GDP.

3. GDP Is the Sum of Incomes in the Economy during a Given Period.

To summarize: You can think about aggregate output— GDP—in three different but equivalent ways.

- *From the production side*: GDP equals the value of the final goods and services produced in the economy during a given period.
- Also from the *production side*: GDP is the sum of value added in the economy during a given period.
- From the *income side*: GDP is the sum of incomes in the economy during a given period.

3.3 REAL VS NOMINAL GDP

Nominal Variables - So far all of the income, expenditure, and production variables we have been discussing are measured at current market (nominal) prices and are referred to as **nominal variables**. Market prices allow us to sum up different goods and services to get a measure of GDP, which more accurately should be called **nominal GDP.** However, nominal variables, such as nominal GDP, have one huge disadvantage: they don't tell us what is happening to economic activity over time if prices are changing.

If, for example, all prices of goods and services in the economy doubled, then nominal GDP would as well, but the actual quantity of goods produced, and hence economic activity, would be unchanged. When you see an increase in nominal GDP, it could be rising because the quantity of goods and services are rising, or alternatively because the prices of goods and services are rising, or both.

Real Variable – A measure of an economic variable in terms of quantities of actual goods and services is called a **real variable**. The measure of GDP that tells us how economic activity is changing over time is real GDP and it is the value of goods and services produced using constant prices rather than current prices, as is the case for nominal GDP. In other words, real GDP is the GDP measure that is adjusted for changes in the average level of prices in the economy, referred to as the **price level.** Real GDP tells us the total amount of output (actual goods and services) produced in an economy. We can write the relationship between real GDP and nominal GDP as follows:

Real GDP = Nominal GDP/ Price Level

Nominal GDP = Price Level * Real GDP

To calculate real GDP for the year 2012, let's return to the example of an economy that only produces apples and oranges. We can calculate GDP with all prices set at the values they had in a given year, called a base year, say, the year 2005:

Real GDP in 2012 = (price of apples in 2005 * quantity of apples in 2012) +
(price of oranges in 2005 * quantity of oranges in 2012)

If apples sold for 50 cents and oranges for $2 in 2005, with 1 billion of each produced in 2012, the calculation of real GDP would be as follows

Real GDP in 2012 = ($0.50 * 1 billion) + ($2 * 1 billion) = $2.5 billion

If the quantity of apples produced rose to 2 billion with the number of oranges produced rising to 1.5 billion, then Real GDP for 2013 would be as follows:

Real GDP in 2013 = (price of apples in 2005 * quantity of apples in 2013) + (price of oranges in 2005 * quantity of oranges in 2013) = ($0.50 * 2 billion) + ($2 * 1.5 billion) = $4.0 billion

Because we kept prices in these calculations at their base-year values, we see that changes in real GDP can only occur if quantities of goods and services produced change. This relationship is exactly what we would want if a measure of GDP is to be an accurate measure of economic activity: changes in **real GDP** provide information on whether economic well-being is improving, while **nominal GDP** frequently does not. Economists quote real GDP in terms of base-year prices. For example, we would say that real GDP in 2013 is $4 billion in 2005 dollars.

If you just looked at the raw data on GDP, you might conclude that every winter the economy goes into recession, when in reality output tends to fall in cold and snowy months. To get a clearer assessment, economic statistics are **seasonally adjusted**, the process by which economists adjust the data to subtract out the usual seasonal fluctuations using advanced statistical techniques.

3.3.1 Chain-Weighted Measures of Real GDP

If prices of some important goods changed dramatically relative to other goods, using a fixed base-year for prices when calculating real GDP can produce misleading results. Between 2005 and 2011, for instance, computer prices fell far more rapidly than other goods. Using the prices for computers from a base year of 2005 would weigh computers too heavily in real GDP calculations relative to using a more recent year as a base year. In 1996, the Bureau of Economic Analysis decided to fix this problem by switching to chain-weighted measures of GDP in which it allows the base year to change continuously. This means that percentage

change in real GDP over a year, say, from 2012 to 2013, is calculated with average prices for goods and services for the 2012–2013 period, that is, the base year is the average of 2012–2013. Then for 2013–2014, the change in real GDP is calculated using a base year that is the average of 2013–2014. Thus every year, the base year is advanced by one year. After calculating these growth rates, we "chain" them together—that is, the level of real GDP is increased each year by the growth rate calculated in this way, so that the level of real GDP can be compared for any two dates. This process in effect updates the relative prices of goods and services every year so that their prices don't get too far out of date.

The Real income of an individual or a country is income adjusted for inflation. It is different from nominal income in which no such adjustments are made. Therefore, an individual must track their real and nominal wages to comprehend their purchasing power.

It is reported by CPI (**Consumer Price Index**). It is an indicator of an individual's well-being, the standard of living, and economic health. When inflation increases, the fall in real income is denoted in terms of inflation per dollar. It is also referred to as real wage.

Real income is nominal income adjusted for inflation. It signifies where a person stands in the context of buying items—the standard of living. It affects the buying process of every individual.

Real Income Formula

There are three common formulas for determining real income:

1. Real Wage = Wages – (Wages x Inflation rate)
2. Real Wage = Wages/(1 + Inflation Rate)
3. Real Wage = (1 – Inflation Rate) x Wages

On the other hand, Nominal income is income that is not adjusted for changes in purchasing power, the amount of goods or services that one can afford with the income, owing to inflation. Adjusting nominal income for inflation is important because inflation decreases the amount of goods or services that one can afford with a given amount of nominal income

Even if nominal income is successfully adjusted for inflation (or PPP), some philosophical issues exist surrounding the appropriateness of nominal income as a measure of well-being.

The concept of nominal income is also commonly used in national income accounting to refer to nominal gross domestic product (GDP), the nominal value of all goods and services produced within a country's borders during a given time period. In evaluating nominal GDP, the output for a given year is evaluated using that year's prices. The practice of using nominal income to refer to nominal GDP is reflected in the vast literature on nominal income targeting, including the work of Henrik Jensen.

Nominal Income Formula

Nominal income = Real income * price index of current year /price index of base year

Real Income	Nominal Income
Real income is the inflation – adjusted earning of an entity, individual or nation	It does not consider inflation rates while calculating an entity's or individual's earning
Real wage represents the purchasing power of an individual	A nomial wage indicates only the earnings of an individual
It varies over the years	It can remain fixed over the years
Real earning are a valuable indicator of an individual's well being as it assesses the number of goods and services bought from that income	It only denotes an individual's current earning that are not adjusted to the changes in inflation rates. Hence, it does not represents the well-being of an individual

3.4 MEANING OF GROSS DOMESTIC PRODUCT (GDP)

3.4.1 Measuring Economic Activity: National Income Accounting

Gross domestic product (GDP), the total value of goods and services produced in an economy, is the broadest measure of economic activity. We add up the value of all the goods and services produced in one year—say, from cell phones, automobiles, text books, DVDs, computers, haircuts, and rock concerts—to determine GDP. The U.S. Bureau of Economic Analysis (part of the U.S. Commerce Department) calculates GDP on a quarterly basis with data provided by other government agencies such as the Census Bureau and the Bureau of Labour Statistics. U.S. GDP is currently around $15 trillion, that is, over $40,000 per person.

There are several alternate definitions and approaches for measuring GDP. Our initial definition of GDP is in terms of goods and services produced. We will also define GDP in terms of expenditure and income: GDP is the total income of everyone in the economy, and is also the total amount of expenditure for goods and services in the economy. These various GDP definitions are equivalent because the total income in an economy must equal the total amount of expenditure, which equals total production. This reasoning makes intuitive sense because there is a buyer and a seller for every good or service produced in the economy. When you pay $15 for a haircut at your local barbershop, your $15 expenditure is $15 of income for the barber, who has produced the $15 haircut.

National income accounting, an accounting system to measure economic activity and its components, shows the relationship among the expenditure, income, and production methods of measuring GDP. We express national income accounting in the fundamental identity of national income accounting:

Total Production = Total Expenditure = Total Income (1)

Equation 1 says that any of the three approaches—production, expenditure, or income—should give the same answer when computing GDP. Let's calculate GDP with each of these approaches to refine our definitions of GDP

3.4.2 Measuring GDP: Production Approach

In the production approach, we define GDP as the current market value of all final goods and services newly produced in the economy during a fixed period of time.

Market Value - An economy produces countless goods and services. This fact raises the age-old question, "How do we compare apples with oranges?" If the economy produces one billion apples and two billion oranges, would you be just as satisfied if it instead produced two billion apples and one billion oranges? If the economic value of apples and oranges is the same, the answer is yes: the total number and value of apples and oranges produced is the same amount, three billion. Because prices of various goods and services are rarely identical, we use national income accounting, which bases the economic value of a good or service on its market value, that is, the price it sells for. To calculate the value of output in the economy, you weigh each good and service by its current market price and add them up. In the case of apples and oranges, GDP would be as follows :

GDP = (price of apples * quantity of apples) + (price of oranges * quantity of oranges)

If apples and oranges each sold for $1, then total output for apples and oranges would indeed be the same in both cases, $3 billion . (2 billion * $1 + 1 billion * $1 = 1 billion * $1 + 2 billion * $1). But if apples sold for 50 cents and oranges for $2, then the total output of apples and oranges would differ in the two cases. In the first case, total output would be $3 billion , while in the second, it would be $4.5 billion .

Non-market goods and services – Unfortunately, for the ease of computing accurate measures of GDP with national income accounting, not all goods and services produced in the economy are sold in markets that provide a market price. Some of these nonmarket goods and services are left out of measures of GDP by necessity. Many household services that are produced within a family or by friends—cleaning, cooking, child care—would be included if it were easy to measure them.

Nonmarket goods and services produced in the underground economy are also not counted in GDP. In the **underground economy**, goods and services produced are hidden from the government, either because they are illegal (drugs or prostitution) or because the person producing the goods and services is avoiding paying taxes on the income he or she receives (the carpenter who is paid in cash and does not declare it on his or her tax return). In some countries, the underground economy (also sometimes referred to as the "black market economy") is very large and as a percentage of the economy it differs substantially among countries. Italy, an example among rich countries, is notorious for tax avoidance, so its GDP is

likely to be understated relative to other countries because of the large size of its underground economy.

Imputed values for non-market goods and services – Many other non-market goods and services lacking a market price are counted in GDP by determining an **imputed value**, an estimate of what the price of the good or service would be if it were traded in a market. For example, an important component of GDP is housing services. When you rent your college apartment, there is a market price that you pay and so it is easy to include it in GDP. But what if, instead, you owned the apartment? A home owner is getting housing services, just as a renter is. To impute the value of these services, the Department of Commerce, which computes GDP, assumes that in effect the homeowner is paying rent to him- or herself. A homeowner's imputed value is the rental price of comparable housing in the market.

The existence of nonmarket goods and services suggests that GDP is an imperfect measure of output produced in the economy. An especially large component of GDP that is not traded in the market is goods and services provided by the government, such as national defence, police, firefighting, and education. The standard practice is to value these services at the cost of providing them. The imputed value of a police officer giving out traffic tickets, for example, is the wages he or she is paid when doing traffic duty.

3.4.3 Final Goods and Services

Production of goods and services typically occurs in stages. We classify goods and services into two types: **intermediate goods** and services are used up entirely in the stages of production, whereas **final goods** and services are the end goods in the production process.

To illustrate, suppose that Intel produces $400 of microprocessors to go into the Mac that Apple sells for $1,500 and it costs $50 to ship the Mac to the computer store where you buy it. The $400 of microprocessors are an intermediate good, the $50 of shipping is an intermediate service, and the $1,500 Mac is a final good. Would it make sense to include all these goods and services in GDP? No. We only include the $1,500 Mac, the final good, in GDP. Otherwise, there would be double counting because the cost of the intermediate goods and services used in producing the Mac are already included in the price for the final good. That is, GDP should include only the market value of final goods and services.

One important technique for calculating the value of all final goods and services produced in the economy is with value added, the value of a firm's output minus the cost of the intermediate goods purchased by the firm. By adding up the value added for each firm, we get the final value of the goods and services produced. In our Mac example, the value added for the producer of microprocessors is $400, while the value added for the shipping firm is $50 (assuming that it did not use any intermediate goods). The value added for Apple is the final price of the Mac minus the cost of the intermediate inputs, $1,500 minus the $400 cost of the microprocessors and the $50 cost of shipping: that is, $1,050. The sum of the value-added items for each of these firms—$1,050 plus $400 plus $50—is $1,500, the same value as the final good, the Mac. Now imagine adding up all the value added in the economy to determine the total value of final

goods and services in the economy. This approach is likely to include all final goods and services in the economy, but appropriately excludes intermediate goods.

3.4.4 Measuring GDP : Expenditure Approach

We now turn to our second technique for computing GDP: with the expenditure approach, GDP is the total spending on currently produced final goods and services in the economy. The **expenditure approach** allows us to get information on the different components of spending that add up to GDP. The national income accounts divide spending into four basic categories: consumption expenditure, investment, government purchases (spending), and net exports, each of which we will discuss in turn. The national income accounts add up these four categories of spending to determine GDP in the **national income identity**.

$Y = C + I + G + NX$

Where,

Y = GDP = total production (output)

C = consumption expenditure

I = investment

G = government purchases of goods and services

NX = net exports = exports – imports

Consumption expenditure (also referred to as personal consumption expenditure and consumption) is the total spending for currently produced consumer goods and services. Consumption expenditure is by far the largest component of GDP and was 70.8% of GDP in 2009.

1. *Consumer durables* are goods purchased by consumers that last a long time (are durable), such as automobiles, electronic goods, and appliances.
2. *Nondurable goods* are short-lived consumer goods such as food, housing services (but not purchases of houses, which are part of investment), gasoline, and clothing.
3. *Services* are purchased by consumers; examples include haircuts, education, medical care, air travel, and financial services.

- **Investment** is spending on currently produced capital goods that are used to produce goods and services over an extended period of time. Investment was 11.4% of GDP in 2009. We can break it down into three basic categories :

1. *Fixed investment*, also referred to as business fixed investment, is spending by businesses on equipment (machines, computers, furniture, and trucks) and structures (factories, stores, and warehouses).

2. *Inventory investment* is the change in inventories held by firms. If inventories are increasing, inventory investment is positive, but if they are decreasing, inventory investment is negative.
3. Residential investment is household purchases of new houses and apartments. (We do not include purchases of existing housing in GDP because they were produced in earlier periods.) Houses and apartments are capital goods for households because they produce a service (a roof over our heads) over an extended period of time. Indeed, for most of us, housing is the most important purchase we ever make in our lives.

- **Government purchases** is spending by the government—whether federal, state, or local—on currently produced goods and services. Government purchases were 20.6% of GDP in 2009.
- **Net exports** are exports minus imports: that is, the value of currently produced goods and services exported, or sold to other countries, minus the value of goods and services imported, or purchased from abroad. It is easy to see why exports should be included in GDP.

3.4.5 Measuring GDP: The Income Approach

The third way of measuring GDP, the income approach, involves adding up all the incomes received by households and firms in the economy, including profits and tax revenue to the government.

Categories of Income

1. *Compensation of employees* includes both the wages and salaries of employees (excluding the self-employed), and employee benefits, which include payments for health insurance and retirement benefits.
2. *Other income* includes income of the self-employed, income that individuals receive from renting their properties (which includes royalty income on books and music), and the net interest earned by individuals from businesses and foreign sources (interest income minus the interest that they pay)
3. *Corporate profits* is made up of the profits after (income) taxes of corporations. It was 9.2% of GDP in 2009.
4. *Net factor income* equals wages, profits, and rent (called factor income) paid to U.S. residents by foreigners minus factor income paid by U.S. residents to foreigners.
5. *Depreciation* is the loss of value of capital from wear and tear or because capital has been scrapped because it is obsolete. To obtain the net income of businesses, depreciation was subtracted out, so in order to compute gross income, we have to add it back into GDP.

Income Measures **-** We add up the first three items to obtain national income. We then add depreciation to obtain gross national product (GNP), which measures the total income earned by U.S. residents.3 However, some of this income is not produced domestically, but rather is

earned from wages, rents, and profits from production abroad. To get a domestically produced measure of gross product, gross domestic product (GDP), we have to add net factor income, which is negative, to gross national product (GNP).

Private disposable income, the amount of income the private sector has available to spend, is another important income measure that is a key determinant of the level of private sector spending. Private disposable income equals the income received by the private sector, plus payments made to the private sector by the government, minus taxes paid to the government.

Private Disposable Income **-** GDP + interest payments on government debt + transfer payments received from the government – taxes

Net Government Income = taxes – transfers- interest payments on government debt.

IN-TEXT QUESTIONS

1. A farmer grows a bushel of wheat and sells it to a miller for $1.00. The miller turns the wheat into flour and then sells the flour to a baker for $3.00. The baker uses the flour to make bread and sells the bread to an engineer for $6.00. The engineer eats the bread. What is the value added by each person? What is GDP?
2. Suppose a woman marries her butler. After they are married, her husband continues to wait on her as before, and she continues to support him as before (but as a husband rather than as an employee). How does the marriage affect GDP? How should it affect GDP?
3. Consider how each of the following events is likely to affect real GDP. Do you think the change in real GDP reflects a similar change in economic well-being?
   a. A hurricane in Florida forces Disney World to shut down for a month.
   b. The discovery of a new, easy-to-grow strain of wheat increases farm harvests.
   c. Increased hostility between unions and man- agement sparks a rash of strikes.
   d. Firms throughout the economy experience falling demand, causing them to lay off workers.
   e. Congress passes new environmental laws that prohibit firms from using production methods that emit large quantities of pollution.
   f. More high-school students drop out of school to take jobs mowing lawns.
   g. Fathers around the country reduce their work- weeks to spend more time with their children.

3.5 LIMITATION OF GDP

Some of GDP's limitations as an economic indicator are below:

1. **Underground Economy**

   The underground economy (or black market) refers to cash and barter transactions that are not formally recorded in GDP and are often used to support the trade of illegal goods and services (i.e., drugs, weapons, prostitution, etc.). The scale of underground economies varies greatly between nations, and, in some cases, they make up a substantial percentage of a country's economic output.

   The underground market is almost impossible to estimate or value, and due to its illegal nature, it is rarely incorporated into a nation's published GDP figure. Thus, some nations' economic output may be understated by GDP.

2. **Environmental Abuses**

   Often, producers can increase their output by polluting or damaging the environment. In developed countries, production is better regulated, and companies that violate environmental laws can face severe fines and penalties.

   However, many developing economies rely on high output to support the growth of their own economies and are less concerned with environmental issues. Nonetheless, there is a consensus that such environmental damage should be counted against a country's GDP since it is not sustainable production and may impact future growth.

3. **Increases in Product Quality**

   As technology advances, producers are able to offer increasingly better products for reduced production costs. For example, smartphone manufacturers may be producing phones with better cameras, more advanced processors, and higher-quality displays.

   Thus, consumers experience higher utility than before without being faced with proportionately inflated prices. Such advancements are not counted in GDP since relative utility gains are difficult to quantify.

4. **Non-Market Production**

   Non-market production refers to goods and services that are produced for private consumption and for which exists no official record of production. For example, consider people who grow their own food or manufacture their own electricity.

   Similar to the black market economy, it is almost impossible to estimate the amount of this sector. The sector's size also varies greatly between countries. For example, the GDP of countries with many subsistence farmers will be understated, whereas in economies with less subsistence farming will more accurately record GDP.

5. **Differences in the distribution of income**

   Although two countries may have similar GDP per capita, the distribution of income in each country may be very different.

6. **Differences in hours worked**

   As when comparing a country over time, the number of hours worked to generate a given level of income may be quite different. For example, workers in the UK tend to work longer hours than those in France, and this would falsely inflate the GDP figures in the UK relative to France. Wider measure of economic welfare usually include an adjustment of GDP to take into account the value derived from leisure.

7. **International price differences**

   International prices will also vary, which is significant because purchasing power is based on price in relation to income. To solve this problem, GDP statistics can be re-calculated in terms of purchasing power. The purchasing power of a currency refers to the quantity of the currency needed to purchase a given unit of a good or common basket of goods and services. Purchasing power is determined by the relative cost of living and inflation rates in different countries. Purchasing power *parity* means equalising the purchasing power of two currencies by taking into account cost of living differences.

8. **Difficulty of assessing true values**

   The true value of public goods such as defence and transport infrastructure and, and merit goods, such as healthcare and education, is largely unknown. This means it is difficult to compare two countries with very different spending on these goods and assets.

9. **Hidden economies**

   Similarly, the existence of a large *hidden economy* may make comparisons based on GDP very misleading. For example, comparing the official GDP of the UK and Russia may be misleading because of the size of the hidden economy in Russia. To avoid tax, transactions may go unrecorded and excluded from official statistics.

10. **Currency conversion**

    GDP figures for different countries must be converted to a common currency, such as the US dollar, and this may give misleading figures. Exchange rates against the US dollar may not be accurate for countries whose international trade is relatively small. In such cases converting to US dollars may significantly under-value national output. This is why converting to purchasing power parity is preferable to converting to US dollars.

3.6 SUMMARY

- Gross domestic product (GDP) measures the income of everyone in the economy and, equivalently, the total expenditure on the economy's output of goods and services.
- Nominal GDP values goods and services at current prices. Real GDP values goods and services at constant prices. Real GDP rises only when the amount of goods and services has increased, whereas nominal GDP can rise either because output has increased or because prices have increased.
- GDP is the sum of four categories of expenditure: consumption, investment, government purchases, and net exports.
- The consumer price index (CPI) measures the price of a fixed basket of goods and services purchased by a typical consumer. Like the GDP deflator, which is the ratio of nominal GDP to real GDP, the CPI measures the overall level of prices.
- The labour-force participation rate shows the fraction of adults who are working or want to work. The unemployment rate shows what fraction of those who would like to work but didn't get the suitable job.

3.7 ANSWER TO IN-TEXT QUESTIONS

1. The value added by the farmer, the miller, and the baker is 1,2 and 3. GDP is total value added, or 1+2+3=6, which equals the value of the final goods.
2. GDP falls by the amount of the butler's salary
3. a. Real GDP falls.
   b. Real GDP increases.
   c. Real GDP falls.
   d. Real GDP falls.
   e. Real GDP is likely to falls.
   f. Real GDP rises but future real GDP may fall.
   g. Real GDP falls.

3.8 SELF-ASSESSMENT QUESTIONS

1. List the two things that GDP measures. How can GDP measure two things at once?
2. Abby consumes only apples. In year 1, red apples cost $1 each, green apples cost $2 each, and Abby buys 10 red apples. In year 2, red apples cost $2, green apples cost $1, and Abby buys 10 green apples.

(A) Compute a consumer price index for apples for each year. Assume that year 1 is the base year in which the consumer basket is fixed. How does your index change from year 1 to year 2?

(B) Compute Abby's nominal spending on apples in each year. How does it change from year 1 to year 2?

3. Place each of the following transactions in one of the four components of expenditure: consumption, investment, government purchases, and net exports.

A. Boeing sells an airplane to the Air Force.

B. Boeing sells an airplane to American Airlines.

C. Boeing sells an airplane to Air France.

D. Boeing sells an airplane to Amelia Earhart.

E. Boeing builds an airplane to be sold next year.

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LESSON-4

DETERMINATION OF GDP ACTUAL AND POTENTIAL GDP; AGGREGATE EXPENDITURE; CONSUMPTION FUNCTION; INVESTMENT FUNCTION; EQUILIBRIUM GDP

STRUCTURE

4.1 LEARNING OBJECTIVES

After reading this chapter you will be familiar with the following concepts:

- Business Cycle
- Determination of Actual GDP and potential GDP
- Aggregate expenditure
- Equilibrium GDP
- Consumption function
- Investment function

4.2 INTRODUCTION

In this chapter we will look at one of the crucial questions of macroeconomics is why output fluctuates around its potential level of output. Then we will see first theory of such fluctuations in real output relative to trend level. The basis of this model is a mutual interaction between spending and output i.e. spending determines income and output, but income and output determine spending.

We will develop Keynesian model of income determination and we will assume for the time being that price is given to develop the concept of aggregate demand. Aggregate supply curve is assumed to be flat. We will discuss consumption and investment in detail. Economy is at equilibrium where level of output produced is equal to the level of output demanded and if they are not equal then there will be an unplanned inventory.

4.3 BUSINESS CYCLE, ACTUAL GDP AND POTENTIAL GDP

Business cycle refers to the fluctuation of the economy between the periods of expansion (recovery) and contraction (recession) around the path of trend growth. The business cycle goes through the four stages of cyclical pattern i.e. expansion, peak, contraction and trough. It is shown in Figure 4.1. Expansion refers to the period when economy experiencing the rapid growth, peak refers to the stage when growth hits its maximum rate, contraction refers to the period when growth slows and trough refers to the refers to the period when economy hits its lowest point. We can also say that expansion is a period between a trough and a peak whereas recession is a period between a peak and a trough. The current stage of economic cycle is determined by the factors such as Gross Domestic Product (GDP), total employment, interest rate and consumer spending. The understanding of business cycle can help businesses and investors to determine when to invest and when to pull out their money.

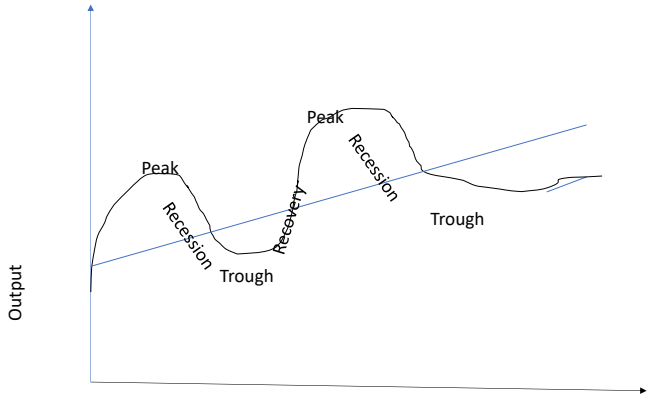

Fig : 4.1 The Business Cycle

The path GDP would take if all the factors of production are fully employed is *trend path of GDP*. Gradually GDP changes for two reasons:

First, when the resources available in the economy increase; resources such as population, physical capital, stock of knowledge etc. An increase in the availability of such resources allow the economy to produce more goods and services and that will result in a rising trend level of output. Second, in an economy output is never fully employed all the time and this full employment of factors of production is an economic concept not a physical concept. Physical concept refers to when you define labor is fully employed, when everyone is working 16 hours per day all year whereas economic concept refers to full employment is when everyone who are looking for a job find a job within a reasonable amount of time. But the economic definition of full employment is not precise; we define it with some convention, for example, we take labour is fully employed when unemployment rate is 5%.

Output is not always at its trend level, rather it fluctuates around the trend level. During an expansion the employment of factors of production increases, due to which production increased. During recession, unemployment increases and production is decreased. So, actual GDP represents the level of output that is produced to meet the demand of all the component i.e. consumption (C), investment (I), government purchases (G) and net exports (NX) of aggregate demand. We will discuss aggregate demand in detail in the next section. So, if aggregate demand increases, actual GDP will also increase. The potential output is the level of economy which the economy is producing at full employment. When economy is producing at its potential output or full employment, the economy will experience its natural rate of unemployment.

Deviation of output from the trend level referred as output gap. In other words, the gap between the actual GDP and the output economy could produce at full employment given the existing resources is known as output gap. So, in Figure 4.2 the trend path shows the potential GDP.

Output gap = Actual GDP – Potential GDP (1)

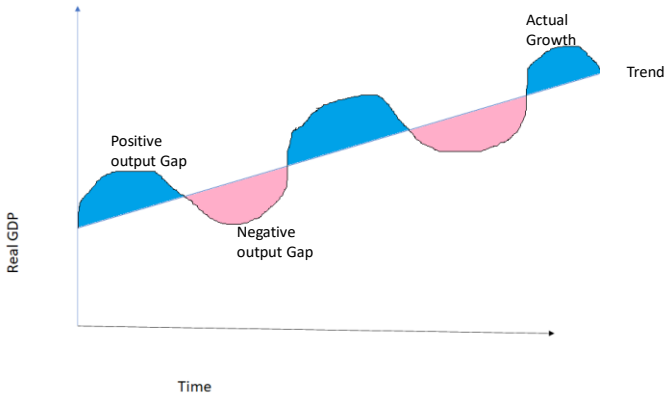

Fig : 4.2 Actual and Potential GDP

When actual GDP is more than the potential GDP it indicates the positive output gap. In such a scenario the current rate of unemployment is less than the natural rate of unemployment. In this scenario economy poses an inflationary risk because the economy is operating above its sustainable level and it will not be possible for businesses to continue increasing output without inflation or other adverse effects.

Whereas, negative output gaps are common after financial crisis or economic shocks and it reflects that economy is underperforming. In this scenario firms are unwilling to spend, which leads to less hiring and continued layoffs in all sectors of an economy. Due to which current rate of unemployment is higher than the natural rate of unemployment. In this situation central bank can stimulate the economy by lowering the rate of interest. We have seen such situation during COVID-19, when most of the economies are underperforming, increase in the unemployment rate and to stimulate the economy the central bank of the countries lowering their interest rate.

IN-TEXT QUESTIONS

Q.1 The economy of a country has a potential output of $500 million. Real GDP of a country is currently $630 million. What will be the output gap in the economy?

Q.2 Which of the following options describe the phases of business cycle in correct order.

(a) Trough, Expansion, Peak, Recession

(b) Recession, Trough, Peak, Expansion

(c) Expansion, Trough, Peak, Recession

(d) Recession, Expansion, Trough, Peak

4.4 AGGREGATE DEMAND AND EQUILIBRIUM OUTPUT

Total amount of goods demanded in the economy is known as aggregate demand. Aggregate demand in an economy has four components: consumption (C), investment (I), government purchases (G) and net exports (NX) i.e.

$$AD = C + I + G + NX \qquad (2)$$

The aggregate demand or quantity of goods demanded depended upon the level of income but for now assume it to be constant i.e. independent of level of income. In Figure 4.3 the aggregate demand is shown by horizontal line AD that is parallel to X-axis at 6 unit.

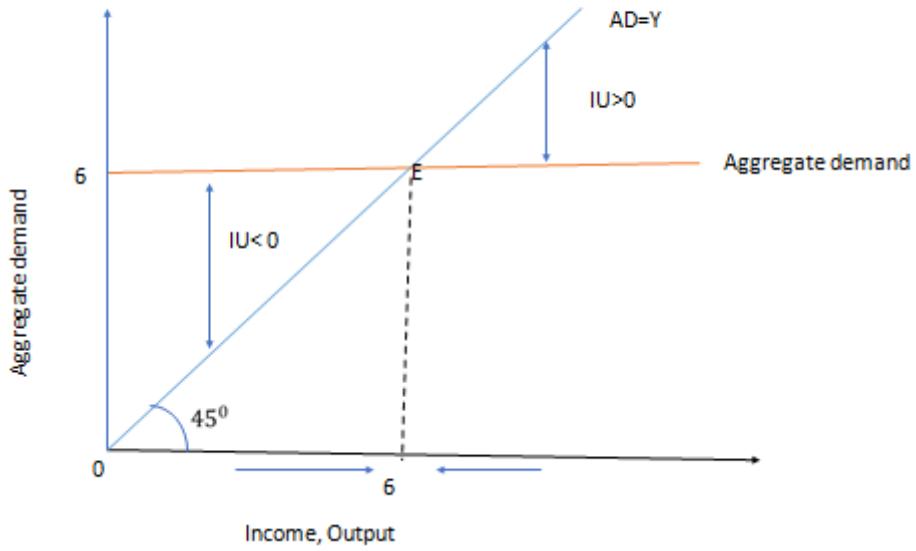

Fig : 4.3 Equilibrium with constant Aggregate Demand

Economy is at equilibrium output when the quantity of output demanded is equal to the quantity of output produced. The 45˚ line shows all the point where aggregate demand is equal to output. Point E is the equilibrium point in the figure 4.3, where the aggregate demand line crosses the 45˚ line i.e. where both aggregate demand and output are equal. At equilibrium point the quantity of output demanded is equal to quantity produced. Suppose the output firm is producing greater than aggregate demand i.e. right of the equilibrium output. In that case firm would not be able to sell all its products and would find its inventories of unsold goods piling up. So, firms cut back on production until aggregate demand and output again in equilibrium, it is shown by horizontal arrow pointing left towards the equilibrium output, 6. Similarly, if the output firm is producing is less than the aggregate demand. In that case firm would run out of goods. So, firms would increase production until aggregate demand and output again in equilibrium, it is shown by horizontal arrow pointing right towards the equilibrium output. At equilibrium, firms are selling as much as they produce. At that point there is no tendency for the level of output to change.

IN-TEXT QUESTIONS

Q.3 Suppose in an economy aggregate demand is a function of consumption and investment. Where, Consumption = 150 and Investment = 100. The economy is currently producing at 200. In this situation what will be the optimal decision of the firm i.e. whether it should increase its production or it should decrease it.

4.4.1 Equilibrium Output and the National Income Identity

We defined the equilibrium output point where aggregate demand is equal to output.

$$Y = AD = C + I + G + NX \quad (3)$$

In the national income accounts, investment and consumption are the amounts of the goods actually bought. Whereas, aggregate demand is the amount of goods people want to buy. So we can distinguish between the actual aggregate demand i.e. measured in accounting context and the economic concept of planned (intended, desired) aggregate demand. In the national income accounts, actual level of output (Y) is equal to the actual aggregate demand (C + I + G + NX). They are not equal if firms miscalculate the demand of households, foreigners and government. Suppose firm decides to produce 10 units of output, however aggregate demand in the economy is 7 units of output. So, firm would sell 7 units of output and the remaining 3 units will add to inventories. This addition to inventories is counted as investment in national income accounts. Although, this is not a planned investment, but still it does count as actual investment. We call this addition to the inventory as unplanned addition to inventory i.e. IU. So, unplanned inventory (IU) is when output is not equal to the amount people want to buy. It is shown by the vertical arrows in the figure 4.3.

$$IU = Y - AD \quad (4)$$

It can be positive or negative. If output is greater than aggregate demand then unplanned inventory is positive it is known as unplanned inventory investment. Due to IU > 0, firms cut back on production until aggregate demand and output again in equilibrium. If output is lesser than aggregate demand then unplanned inventory is negative it is known as unplanned inventory disinvestment.

4.5 CONSUMPTION FUNCTION AND AGGREGATE DEMAND

Consumption is one of the factors that determine the demand for goods and services. For simplicity, we will assume that our economy is closed i.e. net exports are zero and government spending are zero. As demand for consumption goods increase with income, so it shows that consumption function is a function of income i.e. it shows the relationship between consumption and income. Consumption is a function of income but increase in consumption will increase the aggregate demand and output.

4.5.1 Consumption Function

Consumption function shows how the consumption changes with change in an income level and we assume – as it is true also that consumption demand increases with an increase in an income level i.e. positive relation. Figure 4.4 shows the consumption function.

$$C = \overline{C} + cY \quad (5)$$

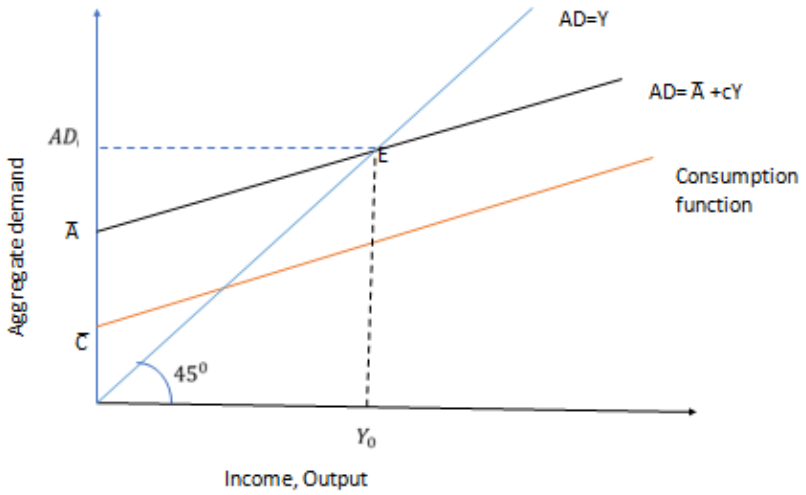

Fig :4.4 Consumption function and Aggregate Demand

$\bar{C} > 0$; $\bar{C}$ is an autonomous consumption i.e. the consumption demand even when income level is zero. It is an intercept of the consumption function.

'c' is a Marginal Propensity to Consume . It is the slope of the consumption function i.e. how much consumption changes with the change in an income level. For example if c = 0.8 and income increases by Rs. 100 then consumption will increase by Rs. 80. Marginal propensity to consume is less than 1 , it means change in consumption is less than the change in income i.e. $0 < c < 1$.

4.5.2 Consumption and Saving

Consumption function is also linked with another economic decision i.e. the decision about how much to save. In making many economic decisions, individuals have to trade-off present against the future like to choose between the consumption and savings, spending and investing, leisure and work. So, both consumption and saving are the same decision, they are like two sides of the same coin. For example, assume that the income of your family is Rs. 60,000 per month and your consumption is Rs. 45,000 then the rest Rs. 15,000 is your saving. Similarly if the fraction 'c' of her increase in an income is spent on consumption then the rest (1-c) is saved. Because income is either spent on consumption or saved.

So, saving is equal to income minus consumption. So, equation (6) is called budget constraint.

$$S \equiv Y - C \qquad (6)$$

We can derive saving function from the consumption function and the budget constraint.

$$S \equiv Y - [\bar{C} + cY]$$

$$S \equiv Y - \bar{C} - cY$$

$$S = -\overline{C} + (1\text{-}c)Y \quad (7)$$

This equation shows the saving function. It shows the relationship between the levels of income and saving; it is positive relationship because (1-c) is positive.

Marginal propensity to save i.e. s = (1 – c) is positive. For example if c = 0.75, then s = 1 – 0.75 = 0.25. Then for a rupee increase in income the consumption will increase by 0.75 and saving will increase by 0.25.

IN-TEXT QUESTIONS

Q.4 In an economy, C = 50 + 0.6Y. Describe the corresponding saving function and value of Consumption when Y = 500.

4.5.3 Consumption, Aggregate Demand and Autonomous Spending

We looked at consumption function in this section that is one of the components of aggregate demand. Let's add investment, net exports and government spending and taxes in the aggregate demand but consider them an autonomous i.e. they are considered outside the model or we can assume they are independent of income. Government affect the equilibrium level of income by its purchases of goods and services and through taxes and transfers. So, that's why we added these components in the model. So, investment is $\overline{I}$, net exports is $\overline{NX}$, government spending is $\overline{G}$, taxes are $\overline{TA}$ and transfers are $\overline{TR}$.

$$YD = Y - TA + TR \quad (8)$$

Here, YD is a disposable income i.e. the income left after deducting taxes and adding transfers.

Now, we look at the Consumption function that is a function of a disposable income.

$$C = \overline{C} + cY$$

$$C = \overline{C} + c\,(Y - TA + TR) \quad (9)$$

As aggregate demand is a function of consumption, investment, government spending and net exports.

$$AD = C + I + G + NX$$

$$AD = \overline{C} + c\,(Y - \overline{TA} + \overline{TR}) + \overline{I} + \overline{G} + \overline{NX}$$

$$AD = [\overline{C} - c\,(\overline{TR} - \overline{TA}) + \overline{I} + \overline{G} + \overline{NX}] + cY \quad (10)$$

$$AD = \overline{A} + cY \quad (11)$$

Here, $\overline{A} = \overline{C} - c\,(\overline{TR} - \overline{TA}) + \overline{I} + \overline{G} + \overline{NX}$ is autonomous or independent of level of income and it is an intercept of an aggregate demand, as shown in Figure 4.5. But aggregate demand depends on the income level as consumption demand increases with the income level. The

aggregate demand schedule is obtained by adding (vertically) the demand of investment, net exports, government spending and consumption.

4.6 EQUILIBRIUM INCOME AND OUTPUT

The equilibrium level of income is where aggregate demand equals output i.e. where the quantity of output demanded is equal to the quantity of output produced i.e.

$$Y = AD = C + I + G + NX$$

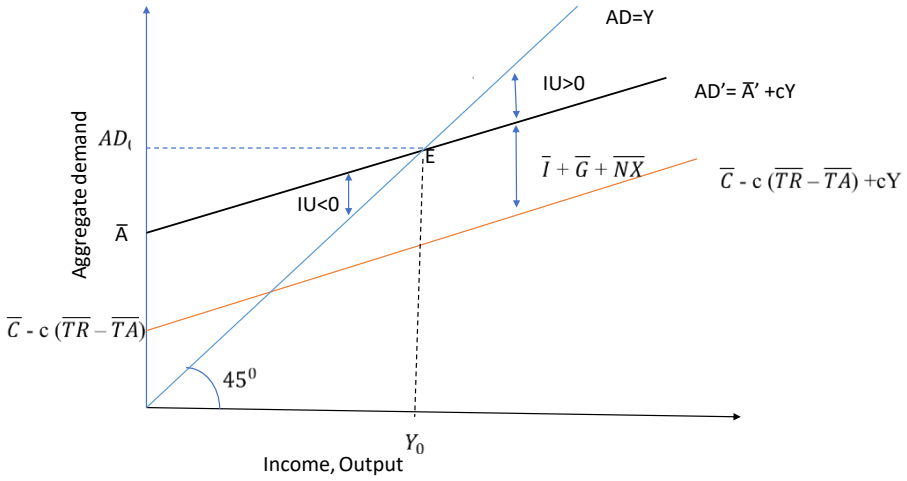

Fig : 4.5 Determination of equilibrium income and output

The 45˚ line shows the point where aggregate demand equals to the output. Only at point E at the corresponding level of income and output, the aggregate demand exactly equal output. It is a point where planned spending equals to production. The arrows in the figure show how the economy reaches equilibrium. At any income level above Y_0, firm finds that output exceeds demand i.e. an unplanned inventory pilling up and therefore they cut their production. Similarly, for an income level below Y_1, firm finds that demand exceeds output and their inventories are declining, so they will increase production. At point Y_0, planned aggregate spending is equal to current production and unplanned inventory are equal to zero.

$$Y = AD$$

Value of AD can be taken from equation (11)

$$Y = \bar{A} + cY \qquad (12)$$

$$Y_0 = \frac{1}{1-c}\bar{A} \qquad (13)$$

$\alpha = \frac{1}{1-c}$, here α is a multiplier. We will discuss this in detail in next chapter.

So, the position of AD is determined by its slope, marginal propensity to consume and autonomous spending i.e. $\overline{A}$. Given the intercept, higher marginal propensity to consume implies higher level of equilibrium income i.e. aggregate demand curve would be steeper in this case. Similarly for a given marginal propensity to consume, a higher level of autonomous spending i.e. $\overline{A}$ implies higher equilibrium level of income. So, the higher marginal propensity to consume (c) and higher the level of autonomous spending ($\overline{A}$) lead to higher level of equilibrium output.

We can also find how a change in the level of autonomous spending would change output.

i.e. $\Delta Y = \frac{1}{1-c}\Delta\overline{A}$ (14)

4.7 SAVING AND INVESTMENT

In equilibrium planned aggregate spending is equal to the production. An alternative to this is where planned investment equals saving. However, this is applicable to an economy where there is no government spending and no foreign trade. In aggregate demand schedule the vertical distance between aggregate demand and consumption schedule is the planned investment, when there is no government spending and no foreign trade, as it is shown in the Figure 4.4. The equilibrium level of income is found at Y_0 where AD crosses the 45° line i.e. where saving is equal to planned investment. Saving schedule can be seen from the vertical distance between the consumption schedule and the 45° line. At point above the equilibrium level of income saving exceeds planned investment while at point below equilibrium level of income planned investment exceeds savings. From National Income Accounting, the equality between saving and investment can be seen. Since income is used either for consumption or for saving.

$$Y = C + S. \quad (14)$$

And without government spending and zero net exports, aggregate demand will be equal to consumption plus investment.

$$Y = C + I \quad (15)$$

Given equation 14 and 15, $C + S = C + I$

$$\text{i.e. } S = I \quad (16)$$

IN-TEXT QUESTIONS

Q.5 Given the saving function S = -8 + 0.2Y and autonomous investment I = Rs.60 crores.

a) Find the level of consumption
b) If investment decreases permanently by Rs.10 crores, what is the new level of consumption.

4.8 SUMMARY

In this chapter we started by looking at the phases of business cycle. Then we discusses about the output gap. Economy is at its equilibrium output when aggregate demand of an economy is equal to the level of output. However, when output is not at its equilibrium level then there will be unplanned inventory. Aggregate demand is a component of four factors: consumption, investment, government spending and net exports. Aggregate demand is affected by the level of income because consumption is a function of income. In an economy the income that is not consumed is saved. Aggregate demand of an economy is affected by autonomous spending and its slope.

4.9 ANSWERS TO IN-TEXT QUESTIONS

Ans.1) 130

Ans.2) (a) Trough, Expansion, Peak, Recession

Ans.3) Increase in production

Ans.4) S = -50 + 0.4Y

Consumption = 350

Ans.5) (a) C = 280

(b) Decrease in investment by Rs. 10 crore will decrease the income by multiple of decrease in investment.

So, $\Delta Y = \Delta I.\text{multiplier}$

Multiplier = 1/1-c = 1/s = 5

$\Delta Y = (-10).5 = -50$ crore

New income = 340 -50 = 290 crore

Consumption = Y.mpc

= 290.(0.8)

= 232

4.10 SELF ASSESSMENT QUESTIONS

Q.1 Suppose we have an economy described by the following functions:

C = 60 + 0.75YD

$\overline{I}$ = 40

$\overline{G}$ = 180

$\overline{TR}$ = 150

a) Calculate the equilibrium level of income, consumption and saving in this model.
b) How the equilibrium level of income changes if government expenditures increased to 210.

Q.2 C = 100 + 0.8Y find the level of income at which saving become zero.

Q.3 Suppose the economy is closed and no government expenditure. Autonomous expenditure is Rs. 400 crore and consumption function is given by C = 150 + 0.7Y. Given this equation find the equilibrium level of income.

Q.4 Given the saving function S= -5 + 0.25Y and autonomous spending, I = Rs. 3 crore.

a) Find the equilibrium level of income

b) Find the level of consumption.

4.11 REFERENCES

- Abel, A., Bernake, B., Croushore, D. (2020). Macroeconomics (10th edition), Pearson
- Dornbousch, R., Fischer, S. & Startz, R. (2011). Macroeconomics (11th edition), McGraw-Hill

LESSON -5

CONCEPT OF MPS, APS, MPC, APC; AUTONOMOUS EXPENDITURE; CONCEPT OF MULTIPLIER

STRUCTURE

5.1 LEARNING OBJECTIVES

After reading this chapter you will be familiar with the following concepts:

- Determination of saving
- MPS, APS, MPC, APC
- Autonomous expenditure
- Multiplier

5.2 INTRODUCTION

As we learned in the earlier chapter that aggregate demand in an economy have four components: consumption, investment, government purchases and net exports. So in this chapter we will discuss the concept of MPS, APS, MPC, APC and their relationship. Then we will discuss about the autonomous expenditure. If there is a multiplier effect, then increase in

autonomous spending will increase output more than one for one. The size of multiplier depends on the marginal propensity to consume (mpc) and on tax rates.

5.3 CONSUMPTION AND SAVINGS

Consumption is one of the factors that determine the demand for goods and services. Consumption function is also linked with another economic decision i.e. the decision about how much to save. Both are the same decision.

5.3.1 Consumption and Saving Decision of an Individual

Let's understand this concept with an example. Himanshi works as a consultant in a tech company. She earns Rs. 80,000 per month after taxes; therefore she can consume Rs. 80,000 worth of goods and services. She also has two other options:

First, she can consume less than her income. As she thinks about her future, she is consuming less than her income to save for her future. She is saving for her retirement and it is an important motivation for her to save. So, in this there is a positive saving.

Alternatively, she can consume more than her income by borrowing or withdrawing from her previously accumulated savings. By borrowing in present, she is consuming more worth of goods and services than her current income. But in future she must repay the loan i.e. her future consumption will be less than her income. In this there is negative saving i.e. dissaving.

With this concept we will discuss saving function in detail in next section.

Here, she faces the trade-off between the current and future consumption. This trade-off will depends upon then real interest prevailing in the economy i.e. if she saves Rs. 10,000 today at 5% real interest rate then in future this will worth Rs. 10,500. So, the relative price of current and future consumption is determined by real interest rate. So, all factors like this real interest rate determined the marginal propensity to consume

5.3.2 Consumption and Saving Function

Consumption is a function of an income. They are positively related that an increase in income will increase consumption but this increase will be less than the income increase, marginal propensity to consume is less than 1.

$$C = \overline{C} + cY \qquad (1)$$

Here, c is the marginal propensity to consume and $\overline{C}$ is the autonomous consumption i.e. consumption even when the income level is zero. Consumption curve is shown in Figure 5.1 where the intercept of this is autonomous consumption.

If disposable income increases, households may choose to increase their consumption or their savings. So, now look at saving function, which is also a function of income. Saving is the part of income which is not consumed because disposable income is either consumed or saved.

Thus,

$$Y = C + S$$

$$S = Y - C \qquad (2)$$

Put the consumption function in equation (2)

$$S = Y - (\overline{C} + cY)$$

$$S = -\overline{C} + (1 - c)Y \qquad (3)$$

Here 1-c = s i.e. marginal propensity to save, so we can also write equation (2) as

$$S = -\overline{C} + sY \qquad (4)$$

We have derived the saving curve from the consumption curve in Figure 5.2.

IN-TEXT QUESTION

Q.1 Given the consumption function equal to 100 – 0.65Y. Find out the saving function.

5.4 MARGINAL PROPENSITY TO CONSUME AND AVERAGE PROPENSITY TO CONSUME

There are two concepts that relate to the propensity to consume, the one is marginal propensity to consume and other is average propensity to consume. These two are important concepts, as how consumption changes in response to a change in an income depends on these two terms.

Average propensity to consume is the ratio of amount of consumption to the total income. It is calculated by dividing the amount of consumption by the total income. Thus,

$$APC = \frac{C}{Y} \qquad (5)$$

APC = Average propensity to consume

C = Consumption

Y = Income

As can be seen from the table 5.1, at the level of income Rs. 1000 the consumption expenditure is equal to Rs. 850. Therefore, average propensity to consume is equal to $\frac{850}{1000}$ = 0.85. Likewise, when the income increases to Rs. 1500 the consumption expenditure increases to Rs. 1000.

Therefore, average propensity to consume is equal to $\frac{1000}{1500}$ = 0.67. APC at a point on consumption function curve can be obtained by measuring the slope of ray from the origin to that point. For example, at income level OY_1, the corresponding point on consumption curve is P. As shown in Fig. 5.1, at income level OY_1, APC is the slope of the ray OP i.e. PY_1/ OY_1 and for income level OY_2, APC is the slope of the ray OQ. APC declined with increase in income level. If the APC remains constant, the increase in consumption will be proportional to the increase in total income. Conversely, if the APC decreases, the increase in consumption will be less than proportional to the increase in total income.

Marginal Propensity to consume is an important concept to tell about how much part of an increased income is spent on consumed and how much saved. It is the ratio of change in consumption to the change in income. Thus,

$$MPC = \frac{\Delta C}{\Delta Y} \qquad (6)$$

MPC stands for marginal propensity to consume;

ΔC stands for change in consumption; and

ΔY stands for change in income.

In table 5.1, we have calculated the Marginal Propensity to Consume. As income increases from Rs. 1000 to Rs. 1500, the consumption increases from Rs. 850 to Rs. 1000. So, here MPC is equal to $\frac{\Delta C}{\Delta Y}$ = 150/500 = 0.3. When income increased from Rs.1500 to Rs. 2000, the consumption expenditure increased from Rs. 1000 to Rs. 1140. Here MPC is 140/500 = 0.28. In table 5.1 we have seen that MPC declines as income increases. It can be estimated by drawing the tangent at a point on the consumption curve. MPC is neither zero nor equal to one, it lies between zero and one. When MPC is zero, out of an increase in income nothing is consumed i.e. all have been saved which is not so realistic. Similarly, for MPC equal to 1, whole of increase in income is consumed.

Table 5.1 Non-linear Consumption Function

Income	Consumption	APC	MPC
0	300	-	-
500	600	1.2	0.6
1000	850	0.85	0.5
1500	1000	0.67	0.3
2000	1140	0.575	0.28
2500	1250	0.5	0.22

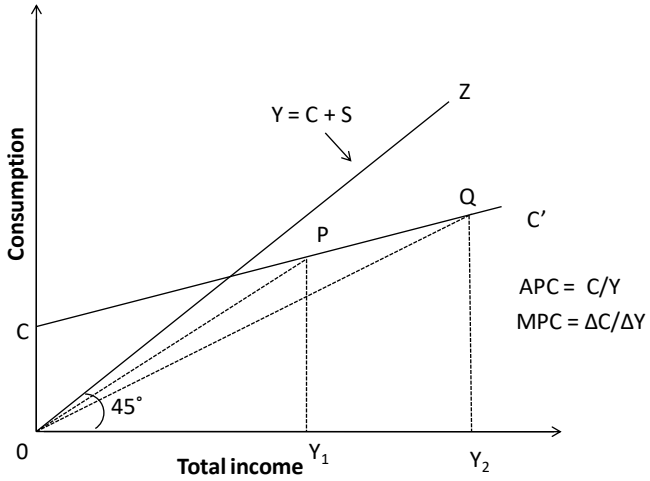

Fig 5.1 : Consumption Function

IN-TEXT QUESTIONS

Q.2 At an income level of Rs. 5000, individual consumption expenditure is Rs. 3500, when his income increases to Rs. 6500, his consumption expenditure increases to Rs.4500. Find out the Marginal propensity to consume and Average propensity to consume at an income level of Rs. 6500.

5.5 MARGINAL PROPENSITY TO SAVE AND AVERAGE PROPENSITY TO SAVE

Relationship between income and saving can be described by marginal propensity to save and average propensity to save.

Average propensity to save is the proportion of disposable income that is not consumed or you can say it is saved.

$$APS = \frac{S}{Y} \qquad (7)$$

As Average Propensity to Consume varies with income, Average Propensity to save also varies with income. In Table 5.1 we have seen APC varies with increase. Now we look at the Table 5.2, to check whether average propensity to save and marginal propensity to save also increases with an increase in an income level.

Income	Consumption	Saving	APS	MPS
0	300	-300	-	-
500	600	-100	- 0.2	-0.4
1000	850	150	0.15	0.5

1500	1000	500	0.33	0.7
2000	1140	860	0.43	0.72
2500	1250	1250	0.50	0.78

In Figure 5.2, the saving curve is drawn in the bottom panel i.e. it shows the gap between the consumption curve and income curve in the upper panel. Up to an income level Y_0 the consumption is greater than income, therefore there is dissaving. Beyond income level Y_0, income exceeds the consumption level that is there is a saving.

Marginal Propensity to save represents how much of the additional disposable income is used for saving. Therefore, it is the change in saving with respect to a change in the income level.

$$MPS = \frac{\Delta S}{\Delta Y} \quad (8)$$

For example, if the disposable income increases from Rs. 15000 to Rs. 17500 and this lead to an increase in saving level by Rs. 1000, then marginal propensity to save is

$$MPS = \frac{\Delta S}{\Delta Y} = \frac{1000}{2500} = 0.4$$

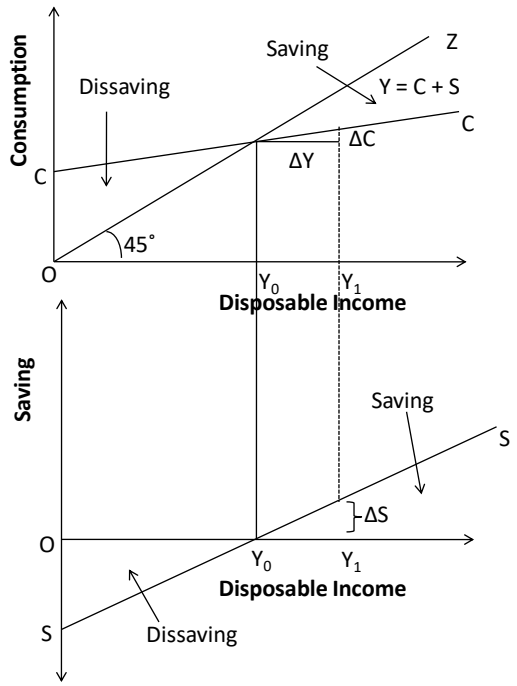

Fig. 5.2: Saving Function derived from Consumption Function

IN-TEXT QUESTIONS

Q.3 At an income level of Rs. 4000, individual saving is Rs. 1500. Find out the average propensity to save at this income level.

5.6 RELATIONSHIP BETWEEN THESE PROPENSITIES

Relationship between MPC and MPS

The additional income that is earned is either consumed or saved, therefore the sum of marginal propensity to consume and marginal propensity to save is equal to 1.

$$MPC + MPS = 1 \qquad (9)$$

We can prove this equation mathematically,

As, $C + S = Y$

Change in income is either consumed or saved. thus,

$$\frac{\Delta C}{\Delta Y} + \frac{\Delta S}{\Delta Y} = \frac{\Delta Y}{Y} = 1$$

$\frac{\Delta C}{\Delta Y}$ is the Marginal Propensity to consume;

$\frac{\Delta S}{\Delta Y}$ is the Marginal Propensity to save

So, we have

$$MPC + MPS = 1$$

We can see this relationship from table 5.1 and 5.2. So, if a consumer consumes 60% of his additional income then the rest 40% will be saved.

Relationship between APC and APS

As we know, Consumption + Saving = Disposable Income

Dividing both sides by the disposable income Y, we have

$$\frac{C}{Y} + \frac{S}{Y} = \frac{Y}{Y} = 1$$

$\frac{C}{Y}$ is average propensity to consume;

$\frac{S}{Y}$ is average propensity to save

So, we have

$$APC + APS = 1 \qquad (10)$$

$$APC = 1 - APS$$

If a society consumes 65 per cent of his disposable income i.e. APC = 0.65, then the rest of the income it will save i.e. APS = 35 per cent. We can also see this relationship in Table 5.1 & 5.2.

In Figure 5.2, with an increase in an income level the absolute amount of saving increases and with that average propensity to save also increases, whereas the average propensity to consume falls with an increase in an income level.

IN-TEXT QUESTIONS

Q.4 At an income level of Rs. 5000, individual consumption expenditure is Rs. 3500, when his income increases to Rs. 6500, his consumption expenditure increases to Rs.4500. Find out the Marginal propensity to save and Average propensity to save at an income level of Rs. 6500. And check whether the relationship between APC and APS ; & MPC and MPS satisfied or not.

5.7 AUTONOMOUS EXPENDITURE

We have learned in the last chapter that aggregate demand has four component i.e. consumption, investment, government expenditure and net exports. Consumption is a function of disposable income i.e. the income that is left after deducting taxes and adding subsidies. Other component we took them as autonomous, it means they are not dependent on income i.e. they are given. So,

$$AD = C + I + G + NX$$

$$AD = \overline{C} + c\,(Y - \overline{TA} + \overline{TR}) + \overline{I} + \overline{G} + \overline{NX}$$

$$AD = [\overline{C} - c\,(\overline{TR} - \overline{TA}) + \overline{I} + \overline{G} + \overline{NX}] + cY$$

$$AD = \overline{A} + cY \qquad (11)$$

Here, $\overline{A} = \overline{C} - c\,(\overline{TR} - \overline{TA}) + \overline{I} + \overline{G} + \overline{NX}$ is an autonomous expenditure. It is independent of income.

There is another term induced expenditure, which says that your spending will change with the change in your income level.

Autonomous spending is an important concept as it will determine the position of Aggregate Demand. Increase in any of the autonomous component will shift the aggregate demand curve to the right and similarly decrease in any of the autonomous component will shift the aggregate demand curve to the left. So, with the shift in aggregate demand the output will also change. We can find how a change in the level of autonomous spending would change output. As,

$$Y = AD \qquad (12)$$

Therefore,

$$Y = \overline{A} + cY \qquad (13)$$

$$Y_0 = \frac{1}{1-c}\overline{A}$$

i.e. $$\Delta Y = \frac{1}{1-c}\Delta\overline{A} \qquad (14)$$

As we looked in the Figure 5.3, initial equilibrium is at point E. Now we look at the impact of increase in autonomous spending. Suppose autonomous spending increases from $\overline{A}$ to $\overline{A}'$ and it is represented by a parallel upward shift in aggregate demand. In this case aggregate demand exceeds the initial level of output Y_0, so inventories are running down. Firms will respond in this situation by increasing their production till the point new equilibrium point E′ is reached. EP in the diagram shows the increase in income (Y_0) and E′P shows the $\Delta\overline{Y}_0 = \frac{1}{1-c}\Delta\overline{A}$.

IN-TEXT QUESTIONS

Q.5 Given marginal propensity to save is 0.3, an increase in autonomous expenditure by RS. 3000, will increase the income by what amount.

5.8 MULTIPLIER

In this section we will answer the question of how much a rupee increase in autonomous spending will increase the equilibrium level of income. You will think that as in equilibrium, income is equal to aggregate demand similarly, a rupee increase in autonomous spending or demand should increase the equilibrium income by same amount. But this is not correct. Let's discuss it why it does not increase by the same amount. Suppose that output increased by the same amount by which autonomous spending has increased. Now this increase in output and income would increase consumption because consumption is a function of income. Out of an increase in income the fraction c is consumed. Assume then that the production is increases to meet this induced expenditure, so outcome and income will increase by 1 + c. This increase in output and income by 1 + c will further induced spending i.e. there will be an excess demand. And this process will go on.

Let's understand it more carefully with the following table. The process starts with an increase in autonomous spending $\overline{A}$. Next production increases by the same amount to meet the increase in demand. So production increases by $\overline{A}$ and this give rise to increase in income by the same amount. In second round, expenditure increases by $c\overline{A}$ i.e. marginal propensity to consume times the increase in income. Again production increases to meet this rise in spending. This increase in production will increase the income by $c\overline{A}$. In third round the induced spending is equal to $c(c\overline{A})$ i.e. $c^2\overline{A}$. Since, c <1 then the term c^2 is less than c, so induced spending in third round is less than the second round and this process will continue.

Round	Increase in demand this round	Increase in production this round	Total increase in income (all rounds)
1	$\Delta\overline{A}$	$\Delta\overline{A}$	$\Delta\overline{A}$
2	$c\Delta\overline{A}$	$c\Delta\overline{A}$	$(1+c)\ \Delta\overline{A}$
3	$c^2\Delta\overline{A}$	$c^2\Delta\overline{A}$	$(1+c+c^2)\ \Delta\overline{A}$
...	...	...	...
...	...	...	...
...	...	...	$\frac{1}{1-c}\Delta\overline{A}$

$$\Delta AD = \Delta\overline{A} + c\Delta\overline{A} + c^2\Delta\overline{A} + c^3\Delta\overline{A} + \ldots \quad (15)$$

$$\Delta AD = \Delta\overline{A}(1 + c + c^2 + c^3 + \ldots.)$$

For c value less than 1, the successive term will decrease. The above equation is a geometric series, the equation simplifies to

$$\Delta AD = \frac{1}{1-c}\Delta\overline{A} = \Delta Y$$

Here the term $\frac{1}{1-c}$ is a multiplier. It is the amount by which equilibrium output changes as a result of increase in autonomous aggregate demand by 1 unit.

$$\Delta Y/\Delta\overline{A} = \frac{1}{1-c} \quad (16)$$

The multiplier which we get when we omitted government sector and net exports, we defined it as 'α', where $\alpha \equiv \frac{1}{1-c}$

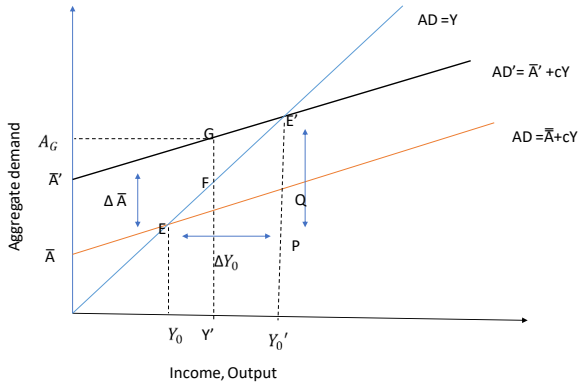

Fig. 5.3: Derivation of the Multiplier

Higher the marginal propensity to consume implies larger fraction of an additional dollar of income will be consumed, that will be added to aggregate demand, thereby causing a large increase in aggregate demand. For example if marginal propensity to consume is 0.75 then the multiplier is 4 whereas if marginal propensity to consume is 0.5 then the multiplier is 2 i.e. larger the marginal propensity to consume is the larger is the multiplier.

Government directly affects the equilibrium level of income in two ways: first, government purchase of goods and services is one of the components of aggregate demand and second, transfers and taxes affect the relation between income and output. In this section we will look at how the government purchases, transfers and taxes affect the equilibrium level of income. Disposable income is the income available for spending after deducting taxes and adding transfers i.e. YD = Y – TA + TR. Take transfers as constant. If we impose proportional income tax then TA = tY i.e. tax is related to an income level. So, with addition to this our consumption is a function of disposable income and with this multiplier also changes. Now, look at how such change happen:

$$C = \overline{C} + cYD$$

$$C = \overline{C} + c(Y - TA + \overline{TR}) \quad (17)$$

$$C = \overline{C} + c(Y - tY + \overline{TR})$$

$$C = \overline{C} + c\,\overline{TR} + c(1 - t)Y \quad (18)$$

$$AD = C + I + G + NX$$

$$AD = \overline{C} + c\,(Y - TA + \overline{TR}) + \overline{I} + \overline{G} + \overline{NX}$$

$$AD = [\overline{C} + c\overline{TR} + \overline{I} + \overline{G} + \overline{NX}] + c(1\text{-}t)Y$$

$$AD = \overline{A} + c(1\text{-}t)Y \quad (19)$$

Here, marginal propensity to consume out of income is c(1-t) instead of c.

At equilibrium, $Y = AD$

$$Y = \overline{A} + c(1\text{-}t)Y$$

$$Y = \frac{\overline{A}}{1-c+ct} \quad (20)$$

Here, the value of a multiplier is $\frac{1}{1-c+ct}$

IN-TEXT QUESTIONS

Q. 6. In an economy, the marginal propensity to save is 0.5 and proportion of income that is taxed is 0.2. Autonomous expenditure is Rs. 10,200.

a) Find the value of a multiplier.
b) Find out the income level.

5.9 SUMMARY

In this chapter we have looked at how the saving function can be derived from the consumption function. There are different propensities i.e. APC , MPC, APS and MPS that determines the consumption and saving function. Then the relationship i.e. APC + APS = 1 and MPC + MPS = 1 is discussed. In aggregate demand function, there is a term known as autonomous expenditure which does not change with the change in the income level. Then the concept of simple multiplier and the multiplier when there is a proportional change in income tax is discussed.

5.10 ANSWERS TO IN-TEXT QUESTIONS

Ans.1 Saving function : S = -100 + 0.35Y

Ans.2 MPC = $\frac{1000}{1500} = 0.67$

APC = $\frac{4500}{6500} = 0.69$

Ans. 3 APS = $\frac{1500}{4000} = 0.375$

Ans. 4 MPS = $\frac{500}{1500} = 0.33$

APS = $\frac{2000}{6500} = 0.31$

Yes, APS + APC = 1 & MPC + MPS = 1

Ans. 5 $\Delta Y = \frac{1}{1-c}\Delta\bar{A}$

$\Delta Y = \frac{1}{0.3} 3000 = 10{,}000$

Ans.6 a) $\alpha = \frac{1}{1-c+ct}$

c = 0.5 & t = 0.2

$\alpha = \frac{1}{1-0.5+0.1} = \frac{1}{0.6} = 1.67$

b) $Y = \frac{A}{1-c+ct} = \frac{10{,}200}{0.6} = 17{,}000$

5.11 SELF ASSESSMENT QUESTIONS

Q.1 Explain the concept of APC and APS, MPC and MPS.

Q.2 What is the relationship between Marginal propensity to save and value of a simple multiplier.

Q.3 What are the factors that would cause AD curve to shift rightward.

Q.4 If marginal propensity to consume increases from 0.60 to 0.80, then what would be the change in the value of multiplier.

Q.5 Given the saving function S = -7 + 0.4Y and autonomous investment I = Rs.50 crores. If investment decreases permanently by Rs.10 crores, what is the new level of consumption.

5.12 REFERENCES

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LESSON – 6

NATIONAL INCOME DETERMINATION IN AN OPEN ECONOMY WITH GOVERNMENT

STRUCTURE

6.1 LEARNING OBJECTIVE

This lesson introduces the basic consumption function and the equilibrium level of output. Also, it explains the definition and meaning of effective and excess demand in a deficiency economy and uses the multiplier mechanism to solve the problem. It also helps to determine the equilibrium level of output and the measures to correct the excess deficiency in demand.

After going through this lesson, you should be able to explain:

- The meaning and objective of multiplier, effective demand and excess demand
- The impact of change in consumption function and aggregate demand in both short and long run
- An impact of increase and decrease in consumption function and aggregate demand
- Helps to determine the factors affecting excess demand and how it leads to the deficiency in demand.

6.2 INTRODUCTION

Aggregate demand is the total amount of goods demanded in the economy.

AD= C+ I+G+NX

Where, consumption (C), investment (I), goods demanded by government (G), net exports (NX), aggregate demand (AD)

Output is at its equilibrium level when the quantity of output produced is equal to the quantity demanded. Thus, an economy is at equilibrium output when

Y= AD= C+ I +G+ NX

When aggregate demand—the amount people want to buy—is not equal to output, there is unplanned inventory investment or disinvestment.

IU= Y- AD

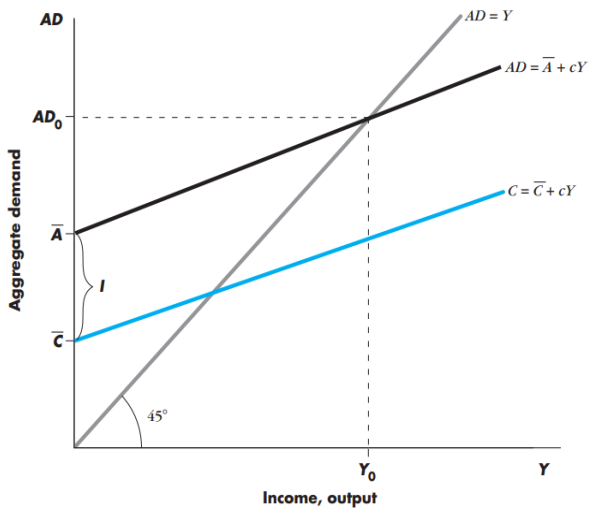
IU is unplanned additions to inventory. If output is greater than aggregate demand, there is unplanned inventory investment, IU > 0. As excess inventory accumulates, firms cut back on production until output and aggregate demand are again in equilibrium. Conversely, if output is below aggregate demand, inventories are drawn down until equilibrium is restored.

6.2.1 The Consumption Function and Aggregate Demand

The demand for consumption goods is not constant but, rather, increases with income: Families with higher incomes consume more than families with lower incomes, and countries where income is higher have higher levels of total consumption. The relationship between consumption and income is described by the consumption function. Consumption demand increases with the level of income.

$$C = \overline{C} + cY \qquad \overline{C} > 0 \qquad 0 < c < 1$$

The slope of the consumption function is c. Along the consumption function the level of consumption rises with income.



$$YD = Y - TA + TR$$
$$C = \overline{C} + cYD = \overline{C} + c(Y + TR - TA)$$

Income not spent on consumption is saved:

$$S \equiv Y - C$$

by definition, saving is equal to income minus consumption.

Substituting the consumption function,

$$S \equiv Y - C = Y - \overline{C} - cY = -\overline{C} + (1 - c)Y$$

we see that saving is an increasing function of the level of income because the marginal propensity to save (MPS), s = 1 - c, is positive.

In other words, saving increases as income rises. For instance, suppose the marginal propensity to consume, c , is 0.9, meaning that 90 cents out of each extra dollar of income is consumed. Then the marginal propensity to save, s , is 0.1, meaning that the remaining 10 cents of each extra dollar of income is saved.

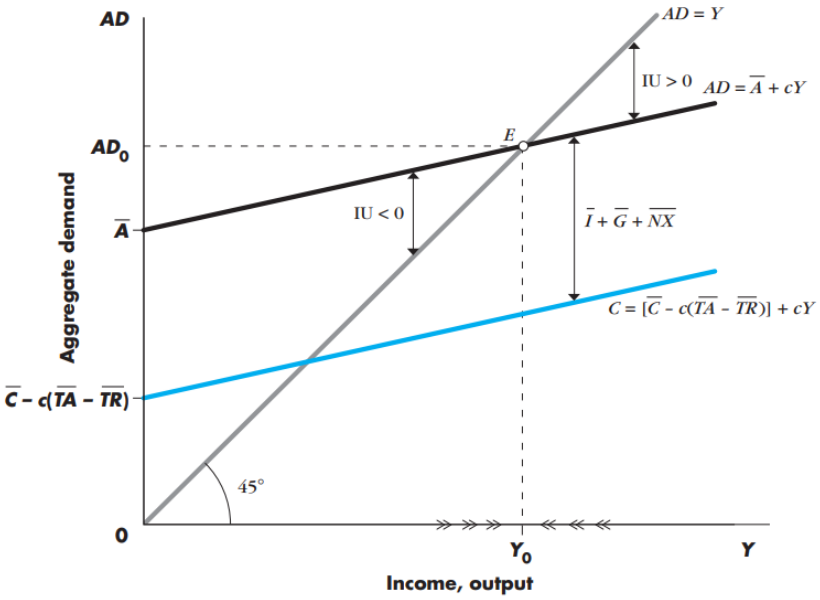
Now we add investment, government spending and taxes, and foreign trade to our model, but we assume for the moment that each is autonomous, that is, determined outside the model and specifically assumed to be independent of income.

Consumption now depends on disposable income.

Aggregate demand is the sum of the consumption function, investment, government spending, and net exports. Continuing to assume that the government sector and foreign trade are exogenous,

$$\begin{aligned} AD &= C + I + G + NX \\ &= \overline{C} + c(Y - \overline{TA} + \overline{TR}) + \overline{I} + \overline{G} + \overline{NX} \\ &= [\overline{C} - c(\overline{TA} - \overline{TR}) + \overline{I} + \overline{G} + \overline{NX}] + cY \\ &= \overline{A} + cY \end{aligned}$$

Aggregate demand also depends on the level of income. It increases with the level of income because consumption demand increases with income. The aggregate demand schedule is obtained by adding (vertically) the demands for consumption, investment, government spending, and net exports at each level of income.



The next step is to use the aggregate demand function, AD to determine the equilibrium levels of output and income. The equilibrium level of income is such that aggregate demand equals output (which in turn equals income). The 45°-line, AD= Y, in Figure above shows points at which output and aggregate demand are equal.

Only at point E in Figure, and at the corresponding equilibrium levels of income and output (Y_0), does aggregate demand exactly equal output. At that level of output and income, planned spending precisely matches production.

The arrows on the horizontal axis, indicate how the economy reaches equilibrium.

6.3 EQUILIBRIUM LEVEL OF OUTPUT

Output is equal to aggregate demand:

Y = AD

Substituting for AD, we have the equilibrium condition

$$Y = \overline{A} + cY$$

Since we have Y on both sides of the equilibrium condition, we can collect the terms and solve for the equilibrium level of income and output, denoted by Y_0:

$$Y_0 = \frac{1}{1-c}\overline{A}$$

Thus, the equilibrium level of output is higher the larger the marginal propensity to consume, c, and the higher the level of autonomous spending

Saving And Investment

In equilibrium, planned investment equals saving. This condition applies only to an economy in which there is no government and no foreign trade.

The equality between saving and investment can be seen directly from national income accounting. Since income is either spent or saved, Y = C + S.

Without government and foreign trade, aggregate demand equals consumption plus investment, Y = C + I. Putting the two together, we have C + S = C + I , or S = I.

If we include government and foreign trade in the analysis, now income can either be spent, saved, or paid in taxes, so Y = C + S + TA − TR and complete aggregate demand is

Y = C + I + G + NX.

Therefore,

$$C + I + G + NX = C + S + TA - TR$$

$$I = S + (TA - TR - G) - NX$$

That is, investment equals private savings (S) plus the government budget surplus (TA − TR − G) minus net exports (NX).

6.4 THE MULTIPLIER MECHANISM

Production of commodities requires investment in factors of production which are land, labor, capital, and entrepreneurship. When taxes or subsidies are absent, the final output value is distributed among the factors of manufacturing, such as wages for labor, rent for land, etc. If there is an excess, it is retained by the entrepreneur which is known as profit.

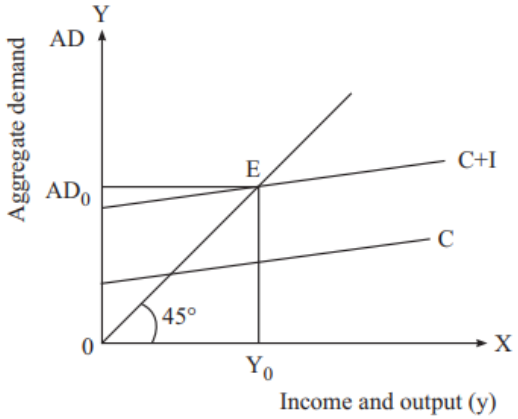
Therefore, the average factor payments (total) or the national income of an economy is equal to the average price of output commodities and the GDP of the nation. The extra output obtained or the profit is generally distributed among various factors of the economy.

So, there is an additional input in the factors of production in each new cycle of production. With such an increase, the utility of the products also goes up and as income increases, the increased amount of output is soaked by consumption.

So, with each new cycle, there is a multiplication of input factors that increase the output and the process goes on increasing until an equilibrium is reached. This process of increasing extra demand and therefore production is known as the multiplier mechanism.

How to determine the equilibrium level of income?

To determine the equilibrium level of income, we can bring C + I and 45-degree line, together in one diagram as given below.



As shown in the diagram above the aggregate demand line shown as C + I cut the 45-degree line at point E. So E is the point of equilibrium where C + I = C + S. Drop perpendicular from point E on both the axis. The perpendicular cuts the horizontal axis which shows income an at point Y_o. Hence the equilibrium level of income is determined at point Y_o. OY0 is the measure of equilibrium level of income. The level of aggregate demand that matches the measure of equilibrium income is determined at point. AD0 on the vertical axis. The distance 0 to Ado (aggregate demand) equal the distance OY_o (equilibrium level of income).

6.4.1 Concept of Effective Demand

According to Keynes who gave the theory of equilibrium income, effective demand in the economy refers to the point where aggregate demand equals the level of output in the short run given the price level. This implies that the equilibrium level of income reflects the effective demand in the economy.

Multipler And Its Working

Multiplier,

$$k = \Delta Y / \Delta I$$

Hence, multiplier is defined as the ratio of increase in Income to increase in investment. Using this equaiton we can also write that

$$\Delta Y = k\Delta I$$

This implies that increse in income is equal to multiplier times increase in investment. Here value of k holds key to increase in income given the value of increase in investment.

Derivation Of the Value of Multiplier

To derive the value of multiplier involving MPC or MPS we can use the condition for attaining the equilibrium income as follows:

C + I = C +S

Since, C + S = Y,

so, C + I = Y

Multiply Δ through out to get,

$$\Delta C + \Delta I = \Delta Y$$

Divide all through by Δ Y to get

$$\frac{\Delta C}{\Delta Y} + \frac{\Delta I}{\Delta Y} = \frac{\Delta Y}{\Delta Y}$$

We know $\frac{\Delta C}{\Delta Y} = MPC$

Then,

$$MPC + \frac{\Delta I}{\Delta Y} = 1$$

$$\frac{\Delta I}{\Delta Y} = 1 - MPC$$

Reversing,

$$\frac{\Delta Y}{\Delta I} = \frac{1}{1 - MPC} = \frac{1}{MPS}$$

Since, $\frac{\Delta Y}{\Delta I} = k$

$$\text{Multiplier } K = \frac{1}{1 - MPC} \text{ or } \frac{1}{MPS}$$

It is found that given the value of MPC and increase in investment the increase in income can be determined. For example, if MPC = 0.5, change in I = Rs100 crores then

$$\Delta Y = \frac{1}{1 - 0.5} \times 100 = 2 \times 100 = 200.$$

The multiplier. $\frac{1}{1-0.5}$ has the common ratio 0.5 which is less than 1.

Using formula for geometric progression,

$$\frac{1}{1-0.5} = 1 + 0.5 + (0.5)^2 + 0.5^3 \ .....$$

Hence,

$$= \frac{1}{1-0.5} \times 100 = \text{Rs } 200 \text{ crores}$$

Table: Working of Multiplier

Rounds	ΔI	ΔY
1.	₹ 100 crores	₹ 100 crores
2.	...	₹ 50 crores
3.	...	₹ 25 crores

6.5 FACTORS AFFECTING EXCESS DEMAND

Let us assume that the level of output is at the maximum possible level or potential level which is achieved by full utilization of the resources of the economy. This means that the economy output will not increase beyond the potential level.

Think of a situation in which the economy is already operating at its potential level of output and there is increase in investment at that level. What will happen? Will the level of output increase further?

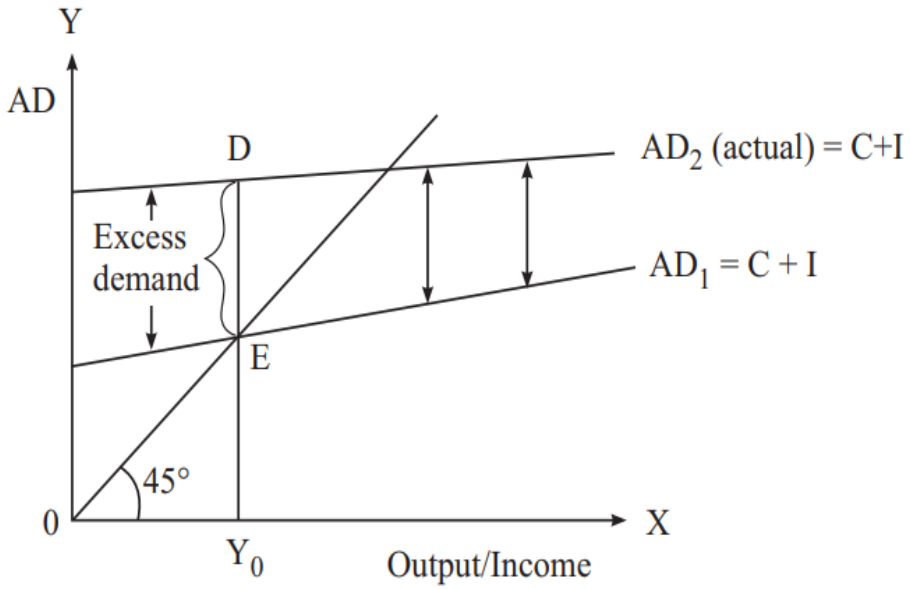
The answer is that the economy's output will not increase. However due to increase in investment, which is a type of fixed or autonomous expenditure, the aggregate demand (AD) will increase and exceed the level of potential output. Such a situation is called excess demand in the country.

So. excess demand refers to the situation when aggregate demand exceeds the potential level of output in the economy. The result of excess demand is inflation in the economy. The reason is obvious.

When people have more money to demand more goods and services while the supply of output is less than this, then the price level will rise to balance the demand and supply forces.

Diagrammatically excess demand is created when AD line shifts upwards at the level of equilibrium as shown in the diagram below:

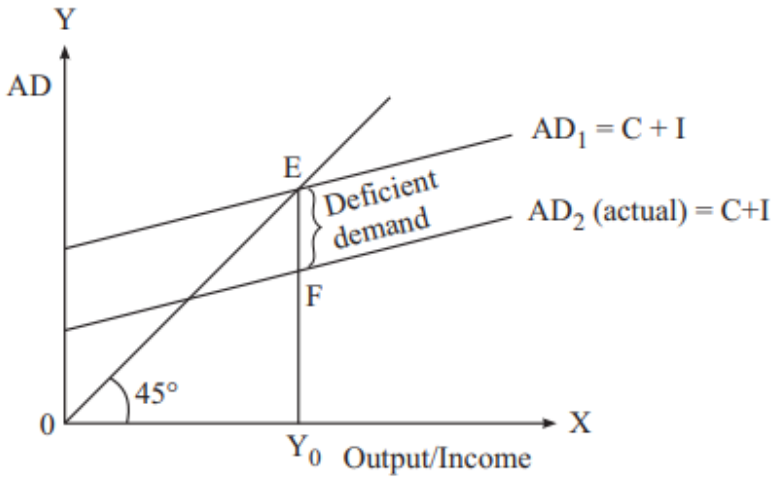
In the diagram, it is shown that the equilibrium position is at point E, where aggregate demand line AD_1 meets 45-degree line. Let the economy be at equilibrium level of income. Now let aggregate demand increases from AD_1 to AD_2 due to increase in fixed investment or consumption. As a result, a gap to the extent of DE is created which is the difference between the new and old aggregate demand. Here the income is not increasing beyond Y_0 after increase in AD. So, the gap DE is the measure of excess demand in the economy. This gap is also called inflationary gap.



6.5.1 Deficiency in Demand

Deficiency in demand is exactly opposite to excess demand situation. When the economy is at its potential level and there is a fall in aggregate demand due to fall in autonomous consumption or investment, then it is called deficiency in demand. At this situation the output level seems to be in surplus in the market and people do not demand it thus putting pressure on price level to fall in order to balance the demand and supply forces.

This creates deflationary pressure in the economy where deflation implies fall in prices of goods and services. Diagrammatically, deficiency in demand is shown by the fall in AD line at the level of potential output as shown below in diagram:



In the diagram, equilibrium income is determined at point E where original aggregate demand, AD1 cuts 45-degree line. The corresponding income at Y_o is the potential level. Now at this level, AD1 falls to AD2 creating a gap EF without any fall in output. EF is the measure of deficiency in demand. This gap is also called deflationary gap.

6.6 MEASURES TO CORRECT EXCESS AND DEFICIENCY IN DEMAND

Both inflation and deflation are bad for the society. Inflation reduces the purchasing power of the people so that they are not able to purchase the quantity they want causing reduction in their level of satisfaction. Poor and middle-income group are worst affected by rise in the price level. Similarly, producers are worst affected by fall in prices or deflation. Their profit level falls due to fall in prices forcing them to reduce investment. This further causes employment level to fall. So, the whole society gets badly affected by deflation.

Hence it is necessary to control inflation and deflation both. The measures or policies, implemented by the government to tackle these problems include:

(i) Fiscal policy

(ii) Monetary policy

There is an elaborated discussion on the fiscal and monetary policies in the upcoming chapters along with the factors affecting its inflationary and deflationary measures.

6.7 SUMMARY

When the output is at its equilibrium level then the aggregate demand of goods is equal to the level of output. As, the aggregate demand consist of planned spendings by the household on consumptions by the firm also government tries to purchase the goods and services including the export items.

When the output is at its equilibrium level, then there are no unintended changes in inventories and all economic units are precisely making the purchase they had planned for the total savings. As, the aggregate adjustment process for all the level of output based on the capital accumulation and the level the level of aggregate demand is itself affected by the level of output which is equal to the level of total income.

And in an economy the actual budget surplus is affected by the changes in tax collection and the transfers resulting from movements in the level of income that occur because of the change in private spending and further leads to the full employment level.

6.8 SELF-ASSESSMENT QUESTIONS

1. What is an autonomous variable? What components of aggregate demand have we specified as being autonomous?
2. Using your knowledge of the amount of time required for the many components of the federal government to agree upon and implement changes in policy. Can you think of any problems with using fiscal policy to stabilize the economy?
3. What is the full-employment budget surplus, and why might it be a more useful measure than the actual or unadjusted, budget surplus?

6.9 REFERENCES

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6.10 SUGGESTED READINGS

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LESSON – 7

FISCAL POLICY

STRUCTURE

7.1 LEARNING OBJECTIVE

This lesson introduces the basic concepts of fiscal policy, its objectives and contractionary and expansionary situations. Also, it explains the definition and meaning of net export functions and helps to determine the equilibrium in National income accounting also it explains its impact on taxes and government purchases which enables the students to build the broad understanding of different fiscal and monetary variables.

After going through this lesson, you should be able to explain:

- The meaning and objective of fiscal policy and its relevance in macroeconomic stability
- The impact of change in government expenditure and taxes in both short and long run
- An increase and decrease in taxes and government purchases
- Helps to determine the equilibrium national income as a function of net exports

7.2 INTRODUCTION

Taken broadly, fiscal policy involves decisions about government spending and taxation. The government's budget reflects both outlays (in the form of government spending) and income (in the form of tax revenue).

Fiscal policy is defined as the policy under which the government uses the instrument of taxation, public spending and public borrowing to achieve various objectives of economic policy. Simply put, it is the policy of government spending and taxation to achieve sustainable growth.

Fiscal policy is often contrasted with monetary policy which is regulated by the central bank. It is largely inspired by the ideas of British economist John Maynard Keynes whose theories were developed in the response to the Great Depression and were hugely influential in the formulation of the New Deal in the U.S. that aimed at huge spending for public projects and social welfare development.

Since the days of Keynes, fiscal policy has been refined to smooth these cyclical movements. As a counter inflationary tool, it has not been particularly effective, partly because of political constraints and partly because of the so-called automatic stabilizers at work.

The political constraints arise from the fact that politicians have found it unpopular to raise taxes and cut government expenditure when the economy becomes overheated. The automatic stabilizers in the economy inhibited the use of discretionary fiscal policy.

For example, during a recession personal income will be shrinking, but, owing to the highly progressive tax system (i.e., tax rates that rise disproportionately on higher incomes), the loss of purchasing power of the consumers is cushioned, leaving more spending money in the hands of the consumers than would otherwise have been the case.

This will be accompanied by a decline in government tax revenues, and, so long as the government does not take steps to reduce expenditures to compensate for the loss of revenue, the net result will be to temper the decline in the level of economic activity.

Conversely, during a boom a disproportionate share of the additional income flows into the treasury, keeping the rate of consumption expenditures below the rate that might have otherwise prevailed in the absence of a progressive tax system.

Suppose the government decides to reduce the budget deficit and does so by increasing taxes while keeping government spending unchanged. Such a change in fiscal policy is often called a fiscal contraction or a fiscal consolidation. (An increase in the deficit, either due to an increase in government spending or to a decrease in taxes, is called a fiscal expansion.)

When policymakers want to influence the economy, they mainly have two tools at their disposal, Monetary policy and Fiscal policy. The monetary policy is regulated by the central banks. Money supply in the market is adjusted by tweaking the interest rates, bank reserve rates, sale and purchase of government securities and foreign exchange.

Fiscal policy is influenced by the governments by adjusting the nature and extent of the taxes, government spending and borrowing. A healthy fiscal policy is important to control inflation, increase employment and maintain the value of money. It has a very important role in managing the economy.

7.3 IMPACT OF CHANGE IN GOVERNMENT EXPENDITURE AND TAXES

In taxes and expenditures, fiscal policy has for its field of action matters that are within government's immediate control. The consequences of such actions are generally predictable: a decrease in personal taxation, for example, will lead to an increase in consumption, which will in turn have a stimulating effect on the economy. Similarly, a reduction in the tax burden on the corporate sector will stimulate investment. Steps taken to increase government spending by public works have a similar expansionary effect. Conversely, a reduction in government expenditure or an increase in tax revenues, without compensatory action, has the effect of contracting the economy.

7.3.1 Objectives of a fiscal policy

The objectives of a fiscal policy may vary- from spending on public asset creation to incentivize private sectors to scale up their operations that directly or indirectly influence the economy of a country. The tools of fiscal policy also aim to stabilize the economy during various inflationary pressures.

The government has two variables to influence fiscal policy, namely

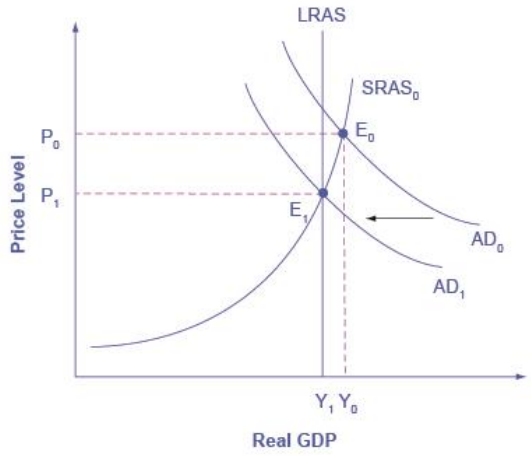
1. Taxation- regulating which the government increases or decreases the disposable cash in the hands of the public.
2. Government spending- using which the government invests in public infrastructural works and other social welfare schemes that directly or indirectly influence the state of the economy.

7.3.2 Contractionary and Expansionary Fiscal Policy

Contractionary fiscal policy is said to be in action when the government reduces spending and increases the taxes at the same time in the country. The result of such a move is that there is very less money available in the market. It leads to reduction in the purchasing power which results in declining consumption.

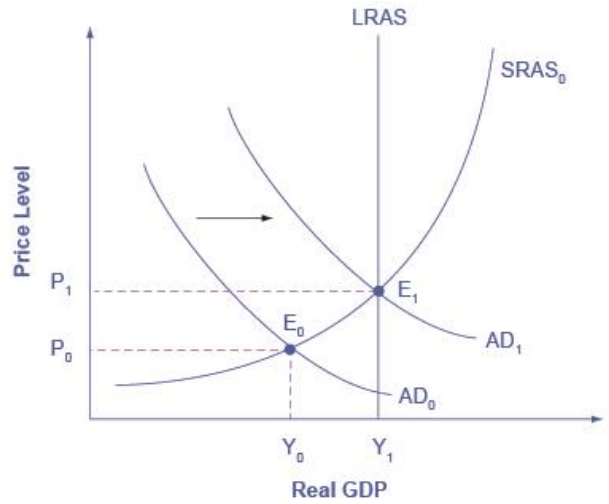
As less capital is available for business, the economy contracts and also causes unemployment. Contractionary policy is used to control inflation.

Expansionary fiscal policy is said to be in action when the government increases the spending and lowers tax rates for boosting economic growth. This increases consumption as there is a rise in purchasing power. Businesses get easy access to credit and therefore invest in new projects and thus, GDP of the nation is increased.



Expansionary Fiscal Policy: The original equilibrium (E_0) represents a recession, occurring at a quantity of output (Y_r) below potential GDP. However, a shift of aggregate demand from AD_0 to AD_1, enacted through an expansionary fiscal policy, can move the economy to a new equilibrium output of E_1 at the level of potential GDP. Since the economy was originally producing below potential GDP, any inflationary increase in the price level from P_0 to P_1 that results should be relatively small.A Contractionary Fiscal Policy: The economy starts at the equilibrium quantity of output Y_r, which is above potential GDP. The extremely high level of aggregate demand will generate inflationary increases in the price level. A contractionary fiscal policy can shift aggregate demand down from AD_0 to AD_1, leading to a new equilibrium output E_1, which occurs at potential GDP.

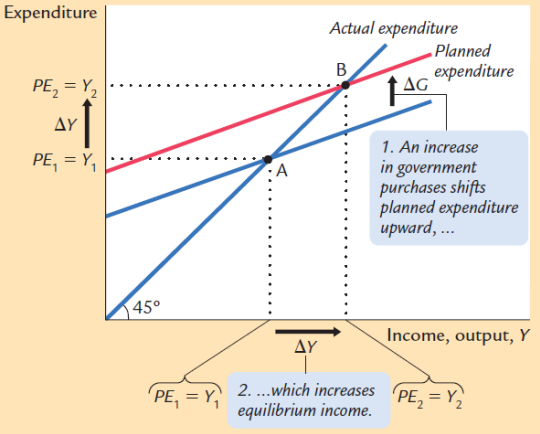
When the government changes its spending or the level of taxes, it affects the demand for the economy's output of goods and services and alters national saving, investment, and the equilibrium interest rate.



1.3.3 An Increase in Government Purchases

Consider first the effects of an increase in government purchases by an amount ΔG. The immediate impact is to increase the demand for goods and services by ΔG. But because total output is fixed by the factors of production, the increase in government purchases must be met by a decrease in some other category of demand.

Disposable income Y – T is unchanged, so consumption C is unchanged as well. Therefore, the increase in government purchases must be met by an equal decrease in investment. To induce investment to fall, the interest rate must rise. Hence, the increase in government purchases causes the interest rate to increase and investment to decrease. Government purchases are said to crowd out investment.



An Increase in Government Purchases in the Keynesian Cross

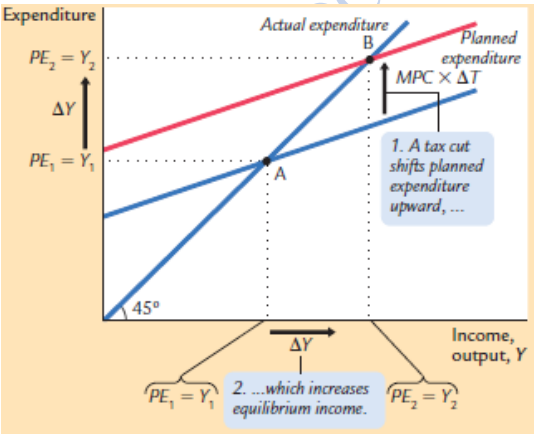
An increase in government purchases of ΔG raises planned expenditure by that amount for any given level of income. The equilibrium moves from point A to point B, and income rises from Y1 to Y2. Note that the increase in income ΔY exceeds the increase in government purchases ΔG. Thus, fiscal policy has a multiplied effect on income.

7.3.4 A Decrease in Taxes

Now consider a reduction in taxes of ΔT. The immediate impact of the tax cut is to raise disposable income and thus to raise consumption. Disposable income rises by ΔT, and consumption rises by an amount equal to ΔT times the marginal propensity to consume MPC.

The higher the MPC, the greater the impact of the tax cut on consumption. Because the economy's output is fixed by the factors of production and the level of government purchases is fixed by the government, the increase in consumption must be met by a decrease in investment.

For investment to fall, the interest rate must rise. Hence, a reduction in taxes, like an increase in government purchases, crowds out investment and raises the interest rate. We can also analyze the effect of a tax cut by looking at saving and investment. Because the tax cut raises disposable income by ΔT, consumption goes up by MPC × ΔT. National saving S, which equals Y − C − G, falls by the same amount as consumption rises.



A Decrease in Taxes in the Keynesian Cross explains a decrease in taxes of ΔT raises planned expenditure by MPC × ΔT for any given level of income. The equilibrium moves from point A to point B, and income rises from Y1 to Y2. Again, fiscal policy has a multiplied effect on income.

7.4 CONCEPT OF THE NET EXPORT FUNCTION

Net export is the amount by which the total value of exports of a country surpasses or exceeds its total value of imports.

Net export is an important component of the calculation of the gross domestic product of an economy. If the total exports have a value that is less than the total value of goods and services imported, then it is considered as a positive value of net exports.

Similarly, if the value of exports is less than imports, it is considered to be negative. The positive and negative values of net exports help people witness a trade surplus or a trade deficit in an economy.

A country that receives the trade surplus shows that it gets more money from other countries. In contrast, the trade deficit economy spends more money in the foreign market.

The net export formula can be represented as follows:

Net exports = Value of exports – Value of imports

Where, the value of exports is the money earned by a country from foreign countries by providing goods and services. The value of imports is the money spent by a country by availing goods and services from other countries.

Net export serves as an indicator of the economic growth of a country. A high net export amount contributes to the GDP of the nation and also makes the country an attractive destination for conducting business.

Example: let us assume Malaysia exports $1.89 billion of rubber and imports $250 million of rubber and $390 million of gasoline from Indonesia.

Using the formula above, Malaysia's net export is calculated as:

Net export = $1.89 billion – ($250 million + $390 million) = $1.89 billion – $640 million

Net export = $1.25 billion

Malaysia's net exports are $1.25 billion.

It serves as an important indicator in GDP calculation as well. When the total amount of exports of a country surpasses the total amount of imports, the amount we get will be called net exports. This is only happening because of international trade and it leads to two aspects i.e. Trade surplus and trade deficit.

When it is in the favor of the country, it results in positive value otherwise negative value when exports are less than the total value of imports. The maximum exports show that the maximum income earned by the country whereas for the country it shows the total income incurred. The country with a trade surplus means it is receiving more money whereas the country with a trade deficit means it is spending more money than earning.

Another way to write the net exports formula –

Net Exports Formula = Exports of Goods + Exports of Services - Imports of Goods - Imports of Services

7.5 DETERMINATION OF EQUILIBRIUM NATIONAL INCOME

The equilibrium level of the national income is defined as that point where the aggregate supply and the aggregate demand are equal to each other.

We know that by exporting goods, a coun-try can expand its market overseas, while by importing goods it reduces the market for domestic goods abroad.Then, the aggregate demand becomes C + I + G + (X – M). The difference between X and M is referred to as balance of trade.

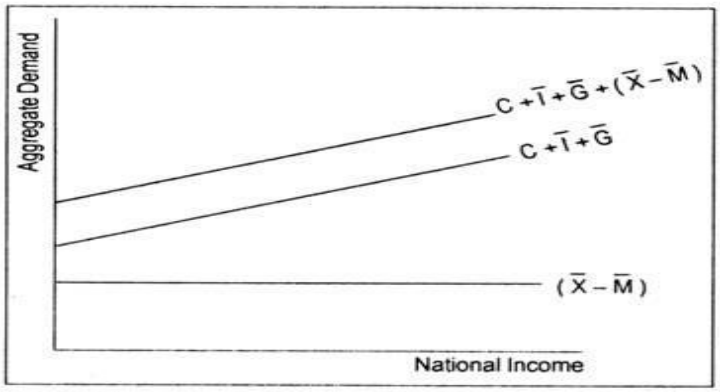


Fig. 3.21: Aggregate Demand in a Four-sector Economy

In a four-sector economy, equilibrium national income is determined when aggregate demand equals aggregate supply. This means that when C + 1 + G + (X – M) line cuts the 45°-line, equilibrium national income is determined.

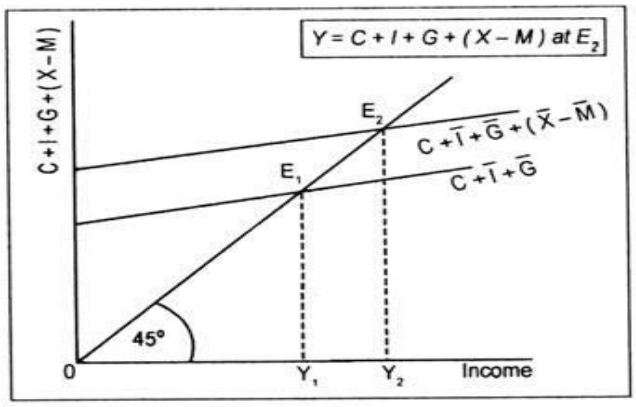


Fig. 3.22: Four-sector Model and National Income

E_1 in Fig, is the equilibrium point when the economy does neither export nor import. If exports and imports are taken into account C + I + G line will shift to C + I + G + (X – M). This aggregate expenditure line now cuts the 45° line at point E_2. Corresponding to this equilibrium point, equilibrium national income, thus, determined is OY_2. Thus, (positive) net exports results in an increase in national income and negative exports (i.e., M > X) results in a reduction in national income.

IN-TEXT QUESTIONS

1. A progressive tax is one which:
   a) Falls most heavily on the less well off members of society
   b) Takes an increasing proportion of income as income rises
   c) Is one which taxes income and wealth
   d) Is one which taxes expenditure
2. Which of the following might be used by government to lower unemployment?
   a) Reduce government spending
   b) Increase taxation
   c) Increase interest rates
   d) Lower taxation

7.5.1 Net Exports as a Function of National Income

Aggregate Expenditure means spending on domestically produced goods and services. There are two additional things we need to consider: exports and imports. This is especially true in the increasingly global world of the 21st Century.

Exports are purchases by foreigners of domestically produced goods and services, which means exports contribute to aggregate expenditure.

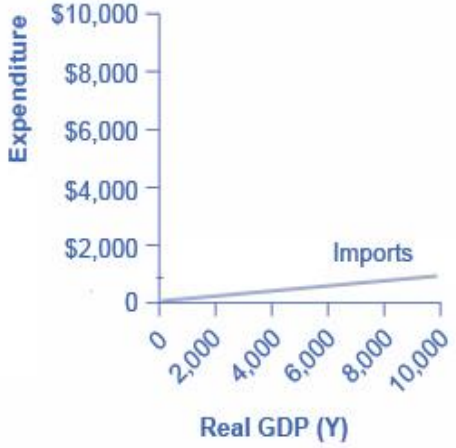
Imports are purchases of foreign goods and services by domestic residents, which means that spending on imports takes away from spending on domestic goods and services.

Let's consider how imports and exports can be graphed as a function of national income (or real GDP).

The demand for imported goods and services is a subset of the demand for goods and services generally. We've established that consumption expenditure increases with national income; thus, in a macroeconomic context, the same thing is true of imports—the purchase of imports increases with national income.

The demand by foreigners for our exports depends on their national income, but it is independent of our domestic national income. We can draw these two relationships as the export and import functions, shown below in Figures below:

(a) The export function



(b) The import function

The export function, which shows how exports change with the level of a country's own real GDP, is drawn as a horizontal line, as in the example in Figure (a) where exports are drawn at a level of $840. Again, as in the case of investment spending and government spending, drawing the export function as horizontal does not imply that exports never change. It just means that they do not change because of what is on the horizontal axis—that is, a country's national income (or GDP)—and instead are shaped by the level of aggregate demand in other countries. More demand for exports from other countries would cause the export function to shift up; less demand for exports from other countries would cause it to shift down.

The import function, as explained above, is an upward-sloping line, showing that as national income rises so do import expenditures. The slope is given by the marginal propensity to import (MPI), which is the percentage change in spending on imports when national income changes.

In Figure (b), the marginal propensity to import is 0.1. Thus, if real GDP is $5,000, imports are $500; if real GDP is $6,000, imports are $600, and so on. A change in the marginal propensity to import, perhaps as a result of changes in preferences, would alter the slope of the import function.

Let's put these ideas together. The balance of international trade in a country is called Net Exports in this model. Net Exports is defined as the value of a country's exports minus the value of its imports. Thus, a trade surplus means a country's exports are greater than its imports and a trade deficit means the country's imports are greater than its exports. A trade surplus is a net addition to a country's aggregate expenditure and a trade deficit is a net subtraction.

When imports are subtracted from exports, we get a downward-sloping line with a slope equal to -MPI. In other words, the higher the national income, the more imports a country purchases and the less it spends on domestic goods and services. Thus, net exports decrease with national income (or real GDP).

7.6 SUMMARY

The present lesson viewed the fiscal policy and its impact of change in both the taxes and the government expenditures also it determines how the fiscal policy leads to the net export function and determines the equilibrium level of income. Also, it explains how the rightward shifts in the fiscal expansion will leads to an increase in the total domestic interest rate and further how it will significantly determine the fiscal expansion in the total output of the economy. As, we know the entire fiscal policy is ineffective when there is complete crowding out.

Also, the fiscal policy is often contrasted with monetary policy which is regulated by the central bank. It is largely inspired by the ideas of British economist John Maynard Keynes whose theories were developed in the response to the Great Depression and were hugely influential in the formulation of the New Deal in the U.S. that aimed at huge spending for public projects and social welfare development.

As we know that we can define the Fiscal policy as a policy under which the government uses the instrument of taxation, public spending and public borrowing to achieve various objectives of economic policy. Simply put, it is the policy of government spending and taxation to achieve sustainable growth which leads to further political constraints within the economy and arise the unpopular raise in taxes and cut government expenditure.

7.7 ANSWER TO IN-TEXT QUESTIONS

1. Correct option is (B) takes an increasing proportion of income as income rises, as the (A) option defines the regressive tax and (C) is direct tax whereas (D) is a definition of an indirect tax.

2. Correct option is (D) as this should boost spending and leads to employ more people to meet the increase in demand of the individuals.

7.8 SELF-ASSESSMENT QUESTIONS

1. A government can fund public spending through taxation or borrowing. Discuss the possible consequences of its decision.

2. Explain two reasons why there may need to be controls on the growth of government spending?

3. Explain the difference between discretionary fiscal policy and automatic stabilizers.

4. Discuss the effectiveness of two fiscal policy options available to a country experiencing a recession.

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LESSON-8

MONEY IN A MODERN ECONOMY

STRUCTURE

8.1 LEARNING OBJECTIVE

This lesson enables the students to understand the modern concept of money which determines the aggregates demand and supply and need of money in current economic situations. Also, it explains why the quantity theory of money plays an significant role in the Keynesian times and tries to build the broad perspective and understanding of the need and supply of money in all the economic and financial dimensions.

After going through this lesson, you should be able to explain:

- The role of money in facilitating the transaction in a standard two period overlapping generations model of quantity demand for money
- Helps to determine the role of money in a model where people derive direct utility by holding money

- Explains why money has positive value in an economy where money is the only medium of exchange

8.2 INTRODUCTION

Traditional macroeconomic analysis groups assets into two categories: those used as a medium of exchange as well as a store of value (currency, checking accounts) and those used only as a store of value (stocks, bonds, savings accounts). The first category of assets is called "money." In this chapter we have discussed its supply and demand.

People hold money to buy goods and services. The more money they need for such transactions, the more money they hold. Thus, the quantity of money in the economy is related to the number of dollars exchanged in transactions.

Although the distinction between monetary and nonmonetary assets remains a useful theoretical tool, in recent years it has become more difficult to use in practice. In part because of the deregulation of banks and other financial institutions, and in part because of improved computer technology, the past two decades have seen rapid financial innovation.

Monetary assets such as checking accounts once paid no interest; today they earn market interest rates and are comparable to nonmonetary assets as stores of value. Nonmonetary assets such as stocks and bonds were once inconvenient to buy and sell; today mutual funds allow depositors to hold stocks and bonds and to make withdrawals simply by writing checks from their accounts.

8.2.1 Concept of money in modern economy

In a more Modern System, paper currency is the means of exchange. Society's acceptance of it for goods and services gives money its value.

Currently there are three main types of money: currency, bank deposits and central bank reserves. Most money in the modern economy is in the form of bank deposits, which are created by commercial banks themselves.

Money is central to the workings of a modern economy. But despite its importance and widespread use, there is not universal agreement on what money actually is. That is partly because what has constituted money has varied over time and from place to place.

Traditionally suggested money should fulfil three important roles:

The first role of money is to be a store of value — something that is expected to retain its value in a reasonably predictable way over time. Gold or silver that was mined hundreds of years ago would still be valuable today. But perishable food would quickly become worthless as it goes bad. So, gold or silver are good stores of value, but perishable food much less so.

Money's second role is to be a unit of account — the thing that goods and services are priced in terms of, for example on menus, contracts or price labels. In modern economies the unit of account is usually a currency, for example, the pound in the United Kingdom, but it could be a

type of good instead. In the past, items would often be priced in terms of something very common, such as staple foods ('bushels of wheat') or farm animals.

Third, money must be a medium of exchange — something that people hold because they plan to swap it for something else, rather than because they want the good itself. For example, in some prisoner of war camps during the Second World War, cigarettes became the medium of exchange in the absence of money. Even non-smokers would have been willing to exchange things for cigarettes; not because they planned to smoke the cigarettes, but because they would later be able to swap them for something that they did want.

Similarly, it is usually efficient for the medium of exchange in the economy to also be the unit of account.

Money tends to influence the modern economy in a number of ways which are as follows –

- Money and Consumption – Money possesses much significance for the consumption activities. Money enables a consumer to utilize his purchasing power and get maximum satisfaction by obtaining what he wants.

  In fact, the consumers can be expressed through money spending. Thus, money provides freedom of choice of consumption. In other word, money enables a consumer to make a rational distribution of his income on various goods of his choice.
- Money and Production – Money has equal importance to the producer. He keeps his account of the values of inputs and outputs in terms of money. Without money production on a large scale would not be possible.

  The use of money enables a producer to concentrate on the organization of production process. It has also facilitated borrowing and lending which are essential in the production process.
- Specialization and Division of Labor – Money plays an important role in large scale specialization and division of labor in the modern production process. Each worker is paid ways accordance with the nature of his work and specialization of the industrial sector.
- As the Basis of Credit – The entire modern business economy is mainly based on credit system which in terms is based on money. All monetary transaction consists of cheques, bills of exchange, drafts, etc. which are not money, but close to money.

  Bank issue such credit instruments and create credit which helps in maintaining circular flow of income within the economy.
- Capital Formation – Money acts as a means of capital formation by transforming savings into investment. Capital formation requires creation of saving, mobilization of savings and channelization of savings into productive investment, which are possible only through the use of money.

- As an index of Economic Growth – Money acts also as an index of economic growth. The various indicators of growth such as GDP, PCI, etc. are calculated in terms of money. Changes in the value of money reflect the growth of an economy.
- Distribution of Income – Money plays an important role in the process of distribution of national income among the various factors of production in the form of rents, wages, interest and profits. All these incomes are measured and received in terms of money.
- Importance in Public Finance – Public finance deals with govt. income and expenditure. Government receives income by the way of taxes, fees, fines, etc. all of which are collected in terms of money. Similarly, all govt. expenditures and payments are done through the way of money. Thus, the entire public finance is managed only in a money economy.

In this way, money plays the most significant role in the modern economy.

8.3 DERIVATIONS OF MONETARY AGGREGATE

Money is defined by people's behavior. Money is what people believe others will accept for payment. This behavioral definition does not tell us which assets in our economy we should consider money. To measure money, we need a precise definition that tells us exactly which assets to include.

Monetary aggregates are the measures of money stock in a country. Central banks measure money aggregates and present them in the form of end-of-month national currency stock series.

M0

M0 is the sum of Currency in Circulation, Bankers' Deposits with RBI, and 'Other' Deposits with RBI

Components of M0:

- Currency in Circulation
- Bankers' Deposits with RBI
- 'Other' Deposits with RBI

Note: 'Other' deposits with RBI comprise mainly: (i) deposits of quasi-government and other financial institutions including primary dealers, (ii) balances in the accounts of foreign Central banks and Governments, (iii) accounts of international agencies such as the International Monetary Fund, etc.

M1 (Narrow Money)

M1 is the sum of Currency with the Public, Demand Deposits with the Banking System, and 'Other' Deposits with RBI.

Components of M1:

- Currency with the Public

- Current Deposits with the Banking System
- Demand Liabilities Portion of Savings Deposits with the Banking System
- 'Other' Deposits with RBI

In other words, M1 = Currency with the Public + Demand Deposits with the Banking System + 'Other' Deposits with RBI

Significance of M1: M1 includes currency with the public and non-interest bearing deposits with the banking sector including that of RBI.

M2

M2 is the sum of Currency with the Public, Current Deposits with the Banking System, Savings Deposits with the Banking System, Certificates of Deposits issued by Banks, Term Deposits of residents with a contractual maturity up to and including one year with the Banking System, and 'Other' Deposits with RBI.

Components of M2:

- Currency with the Public
- Current Deposits with the Banking System
- Demand Liabilities of Savings Deposits with the Banking System
- 'Other' Deposits with RBI

Term Deposits of residents with a contractual maturity up to and including one year with the Banking System

Certificates of Deposits issued by Banks

In other words, M2=M1+ Time Liabilities Portion of Savings Deposits with the Banking System + Certificates of Deposit issued by Banks + Term Deposits of residents with a contractual maturity of up to and including one year with the Banking System.

M3 (Broad Money)

M3 is the sum of Currency with the Public, Current Deposits with the Banking System, Savings Deposits with the Banking System, Certificates of Deposits issued by Banks, Term Deposits of residents with the Banking System, Call/Term borrowings from 'non-depository' financial corporations by the Banking System, and 'Other' Deposits with RBI.

Components of M3:

- Currency with the Public
- Current Deposits with the Banking System
- Savings Deposits with the Banking System

- Certificates of Deposits issued by Banks
- Term Deposits of residents with a contractual maturity up to and including one year with the Banking System
- 'Other' Deposits with RBI
- Term Deposits of residents with a contractual maturity of over one year with the Banking System
- Call/Term borrowings from 'Non-depository' financial corporations by the Banking System.

M3=M2+ Term Deposits of residents with a contractual maturity of over one year with the Banking System + Call/Term borrowings from 'non-depository' financial corporations by the Banking System.

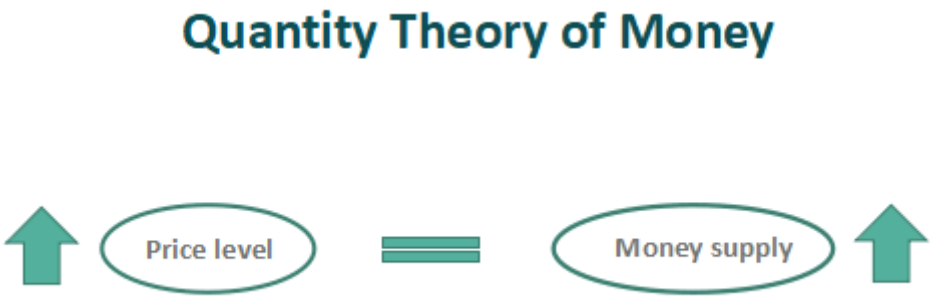
Significance of M3: M3 captures the complete balance sheet of the banking sector.

8.4 QUANTITY THEORY OF MONEY

Now that we have a clear understanding of money and the money supply, we will examine how changes in the money supply affect the economy over both short and long periods of time. We begin with a look at the long run and utilize the quantity theory of money, which links a country's total income to its supply of money.

This theory is the product of the classical economists, also known as classicals, who assumed that wages and prices were completely flexible—that is, they completely adjust to their long-run equilibrium where supply equals demand.

American economist Irving Fisher gave the clearest exposition of this theory in his influential book, The Purchasing Power of Money, published in 1911. Fisher examined the link between the total quantity of money M (the money supply) and the total amount of spending on final goods and services produced in the economy, P x Y where P is the price level and Y is aggregate output (income).



That means if the money in the economy doubles, then the price level of the goods also gets doubled, causing inflation, and consumers will have to pay double the price for the same

amount of goods or services. An increase in prices will be termed inflation, while a decrease in the price of goods is deflation.

8.4.1 Velocity of Money and the Equation of Exchange

The concept that provides the link between M and P x Y is called the **velocity of money** (also more simply referred to as velocity), the average number of times per year that a dollar is spent, or turns over, in buying goods and services produced in the economy. We calculate velocity V by dividing total spending P x Y by the quantity of money M:

$$V = \frac{P \times Y}{M} \qquad (1)$$

If, for example, nominal GDP (P x Y) in a year is $10 trillion and the quantity of money is $2 trillion, velocity is 5, meaning that the average dollar bill is spent five times in purchasing final goods and services in the economy. By multiplying both sides of Equation 1 by M, we obtain the equation of exchange, which relates nominal income to the quantity of money and velocity:

$$M \times V = P \times Y \qquad (2)$$

The equation of exchange states that the quantity of money multiplied by the number of times that this money is spent in a given year must equal nominal income (the total nominal income spent on goods and services in that year). As it stands, Equation 2 is nothing more than an identity—a relationship that is true by definition. It does not tell us, for instance, that when the money supply M changes, nominal income P x Y changes in the same direction. Arise in M, for example, could be offset by a fall in V that leaves M x V and therefore P x Y unchanged. Converting the equation of exchange, an identity, into a theory of how to determine nominal income requires an understanding of the factors that determine velocity.

IN-TEXT QUESTIONS

1. Explain the Keynesian theory of money demand. What motivates did Keynes think determined money demand? What are the two reasons and why did Keynes felt velocity could not be treated as a constant?
2. What factors determine the demand for money in the analysis of transactions demand for money? How does a change in each factor affect the quantity of money demanded?

8.5 THE DEMAND FOR MONEY

Demand for money, the quantity of money that people want to hold.

The three main reasons to hold money, as opposed to bonds, equity, or other financial asset classes, are as follows:

- A transactions-related reason – People need money on a regular basis to pay bills and finance their discretionary consumption;
- A precautionary reason, as an unexpected need, can often arise; and
- A speculative reason if they expect the value of such money to increase versus other asset classes.

The level of income, interest rates, and inflation, in addition to an individual's uncertainty regarding the future, are all elements that impact a person's desire for money. For example, speculative demand for money will be reduced if there is an expectation that interest rates will continue to climb. It is so because this would result in a higher opportunity cost associated with holding onto one's money. Similarly, the anticipation of higher inflation forecasts a greater decline in the purchasing power of money. This, as a result, reduces the speculative motivation for the desire for money.

People's desire for money can be understood by looking at the demand for money in the market. This is because transactions can only be managed with money, and those transactions' value determines how much money people wish to maintain. The greater the number of transactions, the greater the amount expected to be paid. Therefore, it should be obvious that growth in earnings leads to a rise in the demand for money, as the volume of transactions is directly proportional to the amount of money earned.

8.5.1 What determines the demand for money?

The current price level, the current interest rate, and the real gross domestic product determine the amount of money that is demanded. Therefore, the proportion of a person's money that they keep in liquid forms for shopping, such as cash and checks, and the proportion of their wealth that they keep in interest-bearing assets is determined by the interaction of these three elements.

Because the quantity theory of money tells us how much money is held for a given amount of nominal spending, it is in fact a theory of the demand for money. To illustrate, let's first divide both sides of the equation of exchange by V to yield the following:

$$M = \frac{1}{V} \times PY$$

When the money market is in equilibrium, money supply equals money demand, so we can replace M in the equation by Md. In addition, since in the quantity theory of money velocity is assumed to be constant; we can replace 1/V with a constant k. Substituting in k for 1/V and Md for M and then dividing both sides of the equation by P leads to the quantity theory of money demand:

$$\frac{M^d}{P} = k \times Y \qquad (3)$$

This equation tells us that the demand for real money balances, that is, the quantity of money that people want to hold in terms of the goods and services that it can purchase, is proportional to income.

The money demand function is like the demand function for a particular good. Here the "good" is the convenience of holding real money balances. Just as owning an automobile makes it easier for a person to travel, holding money makes it easier to make transactions. Therefore, just as higher income leads to a greater demand for automobiles, higher income also leads to a greater demand for real money balances. This money demand function offers another way to view the quantity equation. To see this, add to the money demand function the condition that the demand for real money balances $(M/P)^d$ must equal the supply M/P. Therefore,

$M/P = kY.$

A simple rearrangement of terms changes this equation into

$M(1/k) = PY,$

which can be written as

$MV = PY,$

where V = 1/k. These few steps of simple mathematics show the link between the demand for money and the velocity of money. When people want to hold a lot of money for each dollar of income (k is large), money changes hands infrequently (V is small). Conversely, when people want to hold only a little money (k is small), money changes hands frequently (V is large). In other words, the money demand parameter k and the velocity of money V are opposite sides of the same coin.

8.5.2 The Assumption of Constant Velocity

The quantity equation can be viewed as a definition: it defines velocity V as the ratio of nominal GDP, PY, to the quantity of money M. Yet if we make the additional assumption that the velocity of money is constant, then the quantity equation becomes a useful theory about the effects of money, called the quantity theory of money. As with many of the assumptions in economics, the assumption of constant velocity is only a simplification of reality. Velocity does change if the money demand function changes. For example, when automatic teller machines were introduced, people could reduce their average money holdings, which meant a fall in the money demand parameter k and an increase in velocity V. Nonetheless, experience shows that the assumption of constant velocity is a useful one in many situations. Let's therefore assume that velocity is constant and see what this assumption implies about the effects of the money supply on the economy. With this assumption included, the quantity equation can be seen as a theory of what determines nominal GDP. The quantity equation says

$$M\bar{V} = PY,$$

where the bar over V means that velocity is fixed. Therefore, a change in the quantity of money (M) must cause a proportionate change in nominal GDP (PY). That is, if velocity is fixed, the quantity of money determines the dollar value of the economy's output.

Some of the advantages of quantity theory of money in economics are as follows:

- It brings out the relationship between money supply and price level in the economy.
- The equation is very simple and easy to understand.
- This equation has been supported by empirical evidence

8.5.3 Limitations

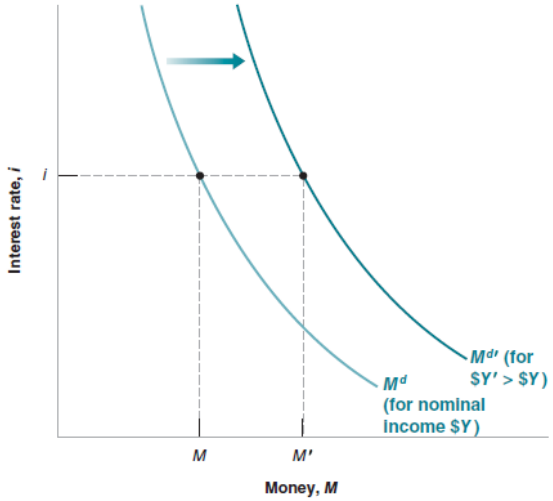
- Its simplicity is one of its limitations. People know that it is obvious that if the money supply increases, the price will decrease. It does not state the cause and effect of the increasing supply.
- This equation assumes that the velocity and output of goods will remain constant and will not be affected by other factors, but an actual change in any of these factors is changeable.
- It does not explain the trade cycle. If a decrease in money causes depression, then if we increase the amount of money, reversal or quantity theory of money inflation should happen, but this is not the case most times in actuality.
- It is not useful in short-term time frames. It is only useful for a long period.
- Some of this theory's elements are inconsistent. For example, P includes the price of all goods or services in the economy, but we know that the price movement of some goods is quite rigid compared to other goods. So, it is hard to say which price we refer to in the equation.

8.5.4 Deriving the Demand for Money

Let's go from this discussion to an equation describing the demand for money. Denote the amount of money people want to hold—their demand for money—by M^d (the superscript d stands for demand). The demand for money in the economy as a whole is just the sum of all the individual demands for money by the people in the economy. Therefore, it depends on the overall level of transactions in the economy and on the interest rate. The overall level of transactions in the economy is hard to measure, but it is likely to be roughly proportional to nominal income (income measured in dollars). If nominal income were to increase by 10%, it is reasonable to think that the dollar value of transactions in the economy would also increase by roughly 10%. So we can write the relation between the demand for money, nominal income, and the interest rate as:

$M^d = \$Y\ L(i)$

where $Y denotes nominal income. Read this equation in the following way: The demand for money M^d is equal to nominal income $Y times a function of the interest rate i, with the function denoted by L(i).



The Demand for Money

For a given level of nominal income, a lower interest rate increases the demand for money. At a given interest rate, an increase in nominal income shifts the demand for money to the right.

8.6 SUMMARY

This lesson concludes that the demand for money explains the desire of people for definite amount of money. As, the money is needed to manage the transaction, and the value of transaction decides the money people wants to keep. The larger the quantum of transactions, the bigger is the amount of money demanded. Since the quantum of transaction relies upon earning, it should be lucid that the rise in income leads to a rise in the demand for money.

When people stockpile their savings in the form of money rather than keeping it in a bank that fetches them interest, the money people stockpile also relies upon the rate of interest. Particularly, when the interest rate rises, people become less focused on stockpiling money since holding money leads to holding less of interest-earning deposits. Thus, they receives less interest and hence the money demanded decreases at high interest rates.

8.7 ANSWER TO IN-TEXT QUESTIONS

1. Keynes felt the demand for money depended on income and interest rates. Money was held to facilitate normal transactions and as a precaution for unexpected transactions. For both of these motives, money demand depended on income. People also held money as an asset, for speculative purposes. The speculative motive depends on income and interest rate. People hold more money for speculative purposes when they expect bond prices to fall, generating a negative return on bonds. Since, money demand varies with interest rates, velocity changes when interest rate changes. Also, since money demand depends upon expectation about future interest rates, unstable expectations can make money demand, and thus velocity, unstable.

2. The factors are real income, price level, interest rate and the brokerage cost of shifting between money and bonds. Increases in real income increases money demand less than proportionately, since the model predicts scale economies in transaction demand.

Increase in prices increase money demand proportionately, since the demand is for real balances. The quantity of money demanded varies inversely with interest rates, since interest is the opportunity cost of holding money. The brokerage fee is the cost of converting other assets (bond) into money. An increase in the cost increases money demand

8.8 SELF-ASSESSMENT QUESTIONS

1. In a barter economy introduction of money may enable people to reach the socially optimum outcome – do you agree? Elaborate in the context of a two-period overlapping generations model of exchange.
2. Can change in the money supply have any impact on the real variables? Discuss your answer in the context of the different model of money that you have studied in this lesson.
3. Define the quantity theory of money and its velocity along with its equation of exchange rate?
4. Explain the determinants of demand for money and its limitations?

8.9 REFERENCES

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8.10 SUGGESTED READINGS

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LESSON – 9

LIQUIDITY PREFERENCE AND CREDIT CREATION

STRUCTURE

9.1 LEARNING OBJECTIVE

This lesson enables the students to understand the modern concept of liquidity preference and credit creation in the monetary policy framework. It focuses on the factors affecting the rate of interest and why there is fluctuation in them. Also, it highlights on the objectives and the tools of monetary policy and the importance of liquidity preference in macroeconomics analysis.

After going through this lesson, you should be able to explain:

- The role of rate of interest in determining the liquidity preference of the individual
- Helps to determine the importance, objectives and tools of monetary policy
- Explains the relevance of credit creation in determining the rate of interest

9.2 INTRODUCTION

John Maynard Keynes developed a theory of money demand that he described as liquidity preference theory—hence the name of the framework—that carefully distinguishes between nominal quantities and real quantities. The nominal quantity of money is in terms of units of currency, like $50 billion.

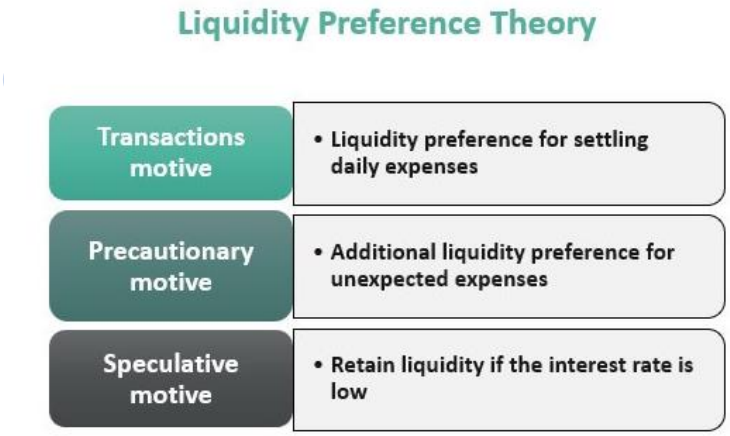
Liquidity preference theory, however, examines the demand for money in terms of the real goods and services it can buy. So, for example, if the price level doubled, the same $50 billion would only buy half as many goods. Keynes reasoned that when people decide how much money they want to hold (demand), they consider real money balances, the quantity of money in real terms.

The liquidity preference theory of interest is a theory of money that explains the monetary nature of the interest rate. Keynes explained that liquidity preference influences the interest rate rather than the saving decision. He believed that money or liquidity is necessary for economic activity in monetary production economies compared to savings.

The individual decides the portion for spending and reserve for future consumption based on income. Also, factors like psychology, uncertainty in the future, and the economy's structure influence the portion for spending. When it comes to saving for the future, people can hold in the form of cash or investment in interest-bearing assets.

If the demand for cash balance is behavior towards risk, both demand for cash balances and the interest rate will manifest an inverse relationship. If the interest rate is low, people prefer holding cash and vice versa. Also, people prefer a high-interest rate for long-term securities compared to a low-interest rate for short-term securities. It also points to the fact that the interest rate is the price for parting the liquidity or parting the desire to hold wealth in the form of cash.

Keynes portrayed the liquidity preference model in terms of three motives:



In this model, demand for real money balances depends on real income, Y, and the nominal interest rate, i. We present Keynes's liquidity preference theory in equation form as follows:

$$M^d/P = L(i, Y)$$
$$- +$$

We refer to this equation as the liquidity preference function: The minus sign below i means that as the nominal interest rate, i, rises, the demand for real money balances falls; the plus sign below Y means that as income, Y, rises, the demand for real money balances also rises.

In Keynes' analysis, money earns little, if any, interest, since it is held as currency or in checking accounts. The opportunity cost of holding money is i, the nominal interest paid on bonds. As the interest rate i rises, it becomes more costly to hold money instead of bonds—that is, the opportunity cost rises— and the quantity of money demanded falls. Note that the demand for real money balances is related to the nominal interest rate i, while spending decisions are related to the real interest rate.

Real money balances are positively related to income for two reasons:

1. As income rises, households and firms conduct more transactions and so keep more money on hand to make purchases.
2. Higher incomes make households and firms wealthier, and the wealthy tend to hold larger quantities of all financial assets, including money.

9.3 DETERMINING THE RATE OF INTEREST

Money demand is affected by the desire to buy things soon, but it is also affected by the opportunity cost of holding money. The opportunity cost is the interest earnings one gives up on other assets to hold money.

If interest rates rise, households and businesses will likely allocate more of their asset holdings into interest-bearing accounts (these are usually not classified as money) and will hold less in the form of money. Since interest-bearing deposits are the primary source of funds used to lend in the financial sector, changes in total money demand affect the supply of loanable funds and in turn affect the interest rates on loans.

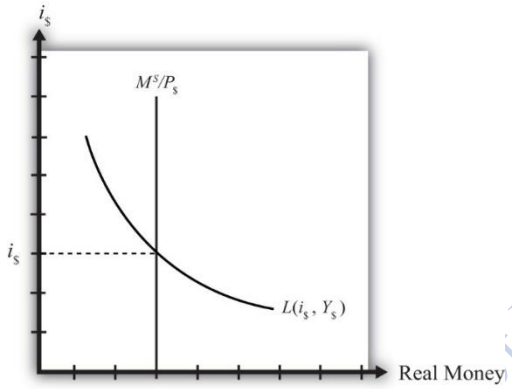
Money supply and money demand will equalize only at one average interest rate. Also, at this interest rate, the supply of loanable funds financial institutions wishes to lend equalizes the amount that borrowers wish to borrow. Thus, the equilibrium interest rate in the economy is the rate that equalizes money supply and money demand.

Using the money market model, several important relationships between key economic variables are shown:

- When the money supply rises (falls), the equilibrium interest rate falls (rises).
- When the price level increases (decreases), the equilibrium interest rate rises (falls).

- When real GDP rises (falls), the equilibrium interest rate rises (falls).

The equilibrium interest rate is determined at the level that will equalize real money supply with real money demand. We can depict the equilibrium by graphing the money supply and demand functions on the following diagram.

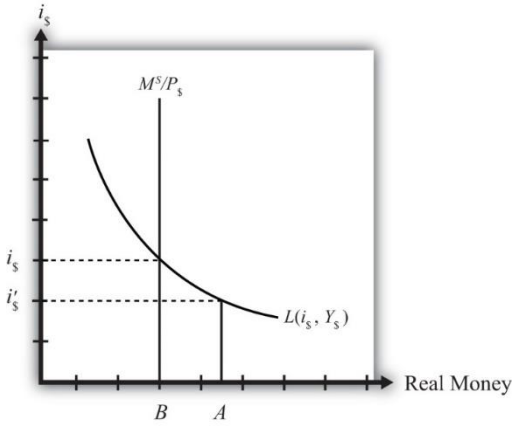


Where the two lines cross determines the equilibrium interest rate in the economy (i_s) since this is the only interest rate that will equalize real money supply with real money demand.

9.3.1 Interest Rate Too Low

Suppose that for some reason the actual interest rate, lies below the equilibrium interest rate. At i'_s, real money demand is given by the value A along the horizontal axis, while real money supply is given by the value B.

Since A is to the right of B, real demand for money exceeds the real money supply. This means that people and businesses wish to hold more assets in a liquid, spendable form rather than holding assets in a less liquid form, such as in a savings account. This excess demand for money will cause households and businesses to convert assets from less liquid accounts into checking accounts or cash in their pockets. A typical transaction would involve a person who withdraws money from a savings account to hold cash in his wallet.



The savings account balance is not considered a part of the M1 money supply; however, the currency the person puts into his wallet is a part of the money supply. Millions of conversions such as this will be the behavioral response to an interest rate that is below equilibrium. As a result, the financial sector will experience a decrease in time deposit balances, which in turn will reduce their capacity to make loans. In other words, withdrawals from savings and other type of nonmoney accounts will reduce the total pool of funds available to be loaned by the financial sector. With fewer funds to lend and the same demand for loans, banks will respond by raising interest rates. Higher interest rates will reduce the demand for loans helping to equalize supply and demand for loans. Finally, as interest rates rise, money demand falls until it equalizes with the actual money supply. Through this mechanism average interest rates will rise, whenever money demand exceeds money supply.

9.3.2 Interest Rate Too High

If the actual interest rate is higher than the equilibrium rate, for some unspecified reason, then the opposite adjustment will occur.

In this case, real money supply will exceed real money demand, meaning that the amount of assets or wealth people and businesses are holding in a liquid, spendable form is greater than the amount they would like to hold.

The behavioral response would be to convert assets from money into interest-bearing nonmoney deposits. A typical transaction would be if a person deposit some of the cash in his wallet into his savings account. This transaction would reduce money holdings since currency in circulation is reduced, but will increase the amount of funds available to loan out by the banks.

The increase in loanable funds, in the face of constant demand for loans, will inspire banks to lower interest rates to stimulate the demand for loans. However, as interest rates fall, the demand for money will rise until it equalizes again with money supply. Through this mechanism average interest rates will fall whenever money supply exceeds money demand.

9.4 CONCEPT OF MONEY SUPPLY

Suppose the central bank decides to supply an amount of money equal to M, so

$M^s = M$

The superscript s stands for supply.

Equilibrium in financial markets requires that money supply be equal to money demand, that

$M^s = Md$. Then, using $M^s = M$, and equation $M^d = \$Y\ L(i)$ for money demand,

the equilibrium condition is

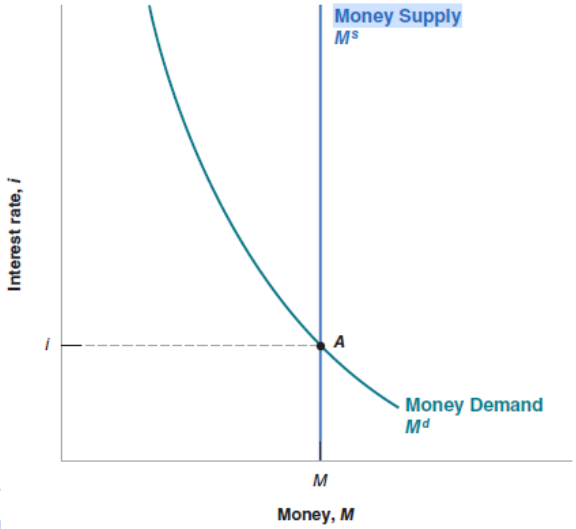
Money supply = Money demand

$M = \$Y\ L(i)$

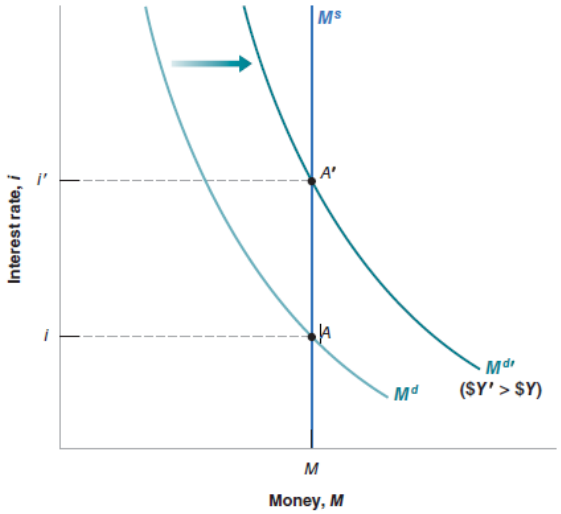
This equation tells us that the interest rate i must be such that, given their income $Y, people are willing to hold an amount of money equal to the existing money supply M. This equilibrium relation is called the LM relation. As for the IS relation, the name of the LM relation is more than 50 years old. The letter L stands for liquidity: Economists use liquidity as a measure of how easily an asset can be exchanged for money. Money is fully liquid; other assets less so.

The Determination of the Interest Rate

The interest rate must be such that the supply of money (which is independent of the interest rate) is equal to the demand for money (which does depend on the interest rate).



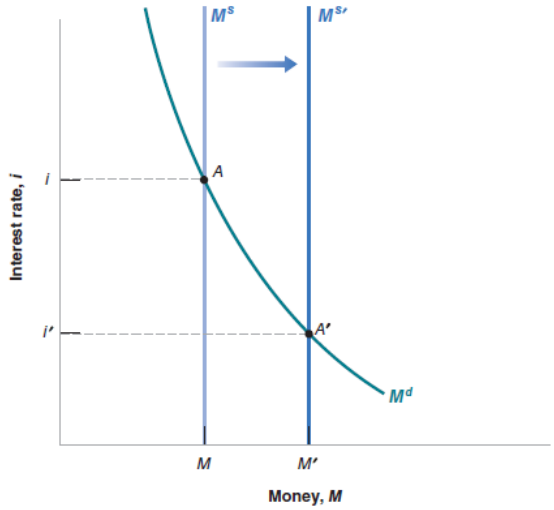
We can think of the demand for money as a demand for liquidity. The letter M stands for money. The demand for liquidity must equal the supply of money.



The Effects of an Increase in Nominal Income on the Interest Rate

An increase in nominal income leads to an increase in the interest rate.

*Money is measured on the horizontal axis, and the interest rate is measured on the vertical axis.



The Effects of an Increase in the Money Supply on the Interest Rate

An increase in the supply of money leads to a decrease in the interest rate.

*Shows the effects of an increase in nominal income on the interest rate.

The demand for money, M^d, drawn for a given level of nominal income, $Y, is downward sloping: A higher interest rate implies a lower demand for money. The supply of money is drawn as the vertical line denoted M^s: The money supply equals M and is independent of the interest rate. Equilibrium occurs at point A, and the equilibrium interest rate is given by i.

An increase in nominal income leads to an increase in the interest rate. The reason: At the initial interest rate, the demand for money exceeds the supply. An increase in the interest rate is needed to decrease the amount of money people want to hold and to reestablish equilibrium.

IN-TEXT QUESTIONS

Q1. How does Monetary Policy work in a scare reserve system?

Q2. How does monetary Policy impact the growth rate?

Q3. Explain the different conditions for expansionary and contractionary monetary policy?

9.5 IMPORTANCE OF CREDIT CREATION

The process of credit creation is considered one of the most important functions performed by a commercial bank.

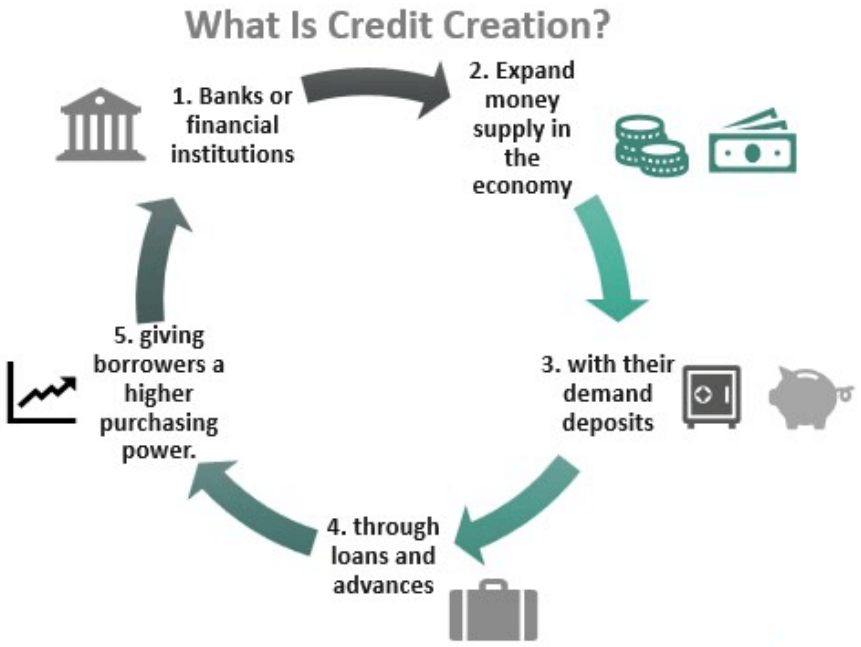
The central bank of a country is responsible for ensuring the supply of money in the economy by circulating the currency. It also ensures that for fulfilling all the transactions, there should be appropriate currency in the system.

This process cannot be implemented by the central bank alone. For this, they require the help of commercial banks and their reserves. Commercial banks perform the function of credit creation in an economy.

Therefore, the money that is created by commercial banks is known as credit money. This is achieved by the commercial banks in the form of purchasing securities and providing loans. The commercial banks facilitate the loans by utilizing the deposits that are obtained from the public.

There are restrictions on the amount of money that can provide credits from the total deposits that a bank obtains from the public. As per the rule, the commercial banks need to maintain a certain portion of the public deposits as reserves with the central bank that will be used for meeting the immediate cash requirements of the depositors.

Only after keeping aside the required amount of those reserves the commercial banks are permitted to lend those amounts to individuals or businesses.



Liquidity and profitability are two required methods of credit creation that lubricate and oil the banks' ability to generate credit. Firstly, the banks must maintain certain reserves from their total demand deposits to pay for the cash demands of their depositors.

Secondly, the profitability of banks makes the credit cycle sustainable as it ensures banks are in a healthy position. At the same time, it indicates that banks are generating higher revenues from their interest earnings than what they are paying their customers on their demand deposits.

Formula,

Total Credit Creation = Initial deposits x 1/r

Where, 'r' = the cash reserve ratio (CRR)

The money multiplier means the ratio by which the remaining deposits will increase or generate credit as a multiple of the initial deposits. Thus, the function of the money multiplier is the inverse of CRR. These reserves are maintained for emergencies when a bank faces poor financial conditions is important.

Credit Multiplier Coefficient or Money Multiplier = 1/r

Calculation

For instance, an individual deposits $10,000 with a bank, and the legal reserve ratio that the bank shall maintain is 15%. Thus, the calculation for credit creation will be,

Total Credit Creation = Initial deposits x 1/r

Credit Multiplier/ Money Multiplier coefficient = 1/r

Here, 'r' = 15%

Money Multiplier Coefficient = 1/15% = 1/0.15 = 6.66

Total Credit Creation = $10,000 x 6.66 = $66,600

Thus, the bank will provide advances and loans to its customers worth $66,600. As a result, when the bank lends $66,600 to a borrower, he might take this amount and deposit it in another bank. As a result, this amount of $66,600 will become demand deposits for the next bank and is liable to LRR charges again.

9.6 MONETARY POLICY

Monetary policy is an economic policy that manages the size and growth rate of the money supply in an economy. It is a powerful tool to regulate macroeconomic variables such as inflation and unemployment.

These policies are implemented through different tools, including the adjustment of the interest rates, purchase or sale of government securities, and changing the amount of cash circulating in the economy. The central bank or a similar regulatory organization is responsible for formulating these policies.

9.6.1 Objectives of Monetary Policy

The primary objectives of monetary policies are the management of inflation or unemployment and maintenance of currency exchange rates:

1. *Inflation* - Monetary policies can target inflation levels. A low level of inflation is considered to be healthy for the economy. If inflation is high, a contractionary policy can address this issue.
2. *Unemployment* - Monetary policies can influence the level of unemployment in the economy. For example, an expansionary monetary policy generally decreases unemployment because the higher money supply stimulates business activities that lead to the expansion of the job market.
3. *Currency exchange rates* - Using its fiscal authority, a central bank can regulate the exchange rates between domestic and foreign currencies. For example, the central bank may increase the money supply by issuing more currency. In such a case, the domestic currency becomes cheaper relative to its foreign counterparts.

9.6.2 Tools of Monetary Policy

Central banks use various tools to implement monetary policies. The widely utilized policy tools include:

1. *Interest rate adjustment* - A central bank can influence interest rates by changing the discount rate. The discount rate (base rate) is an interest rate charged by a central bank to banks for short-term loans. For example, if a central bank increases the discount rate, the cost of borrowing for the banks increases. Subsequently, the banks will increase the interest rate they charge their customers. Thus, the cost of borrowing in the economy will increase, and the money supply will decrease.
2. *Change reserve requirements* - Central banks usually set up the minimum number of reserves that must be held by a commercial bank. By changing the required amount, the central bank can influence the money supply in the economy. If monetary authorities increase the required reserve amount, commercial banks find less money available to lend to their clients, and thus, money supply decreases.

   Commercial banks can't use the reserves to make loans or fund investments into new businesses. Since it constitutes a lost opportunity for the commercial banks, central banks pay them interest on the reserves. The interest is known as IOR or IORR (interest on reserves or interest on required reserves).
3. *Open market operations* - The central bank can either purchase or sell securities issued by the government to affect the money supply. For example, central banks can purchase government bonds. As a result, banks will obtain more money to increase the lending and money supply in the economy.

In modern economies, open market economies are the way central banks change the supply of money is by buying or selling bonds in the bond market. If a central bank wants to increase the amount of money in the economy, it buys bonds and pays for them by creating money.

If it wants to decrease the amount of money in the economy, it sells bonds and removes from circulation the money it receives in exchange for the bonds. These actions are called open market operations because they take place in the "open market" for bonds.

The assets of the central bank are the bonds it holds in its portfolio. Its liabilities are the stock of money in the economy. Open market operations lead to equal changes in assets and liabilities.

If the central bank buys, say, $1 million worth of bonds, the amount of bonds it holds is higher by $1 million, and so is the amount of money in the economy. Such an operation is called an expansionary open market operation, because the central bank increases (expands) the supply of money.

If the central bank sells $1 million worth of bonds, both the amount of bonds held by the central bank and the amount of money in the economy are lower by $1 million. Such an operation is called a contractionary open market operation, because the central bank decreases (contracts) the supply of money.

Balance Sheet

Assets	Liabilities
Bonds	Money (currency)

The Effects of an Expansionary Open Market Operation

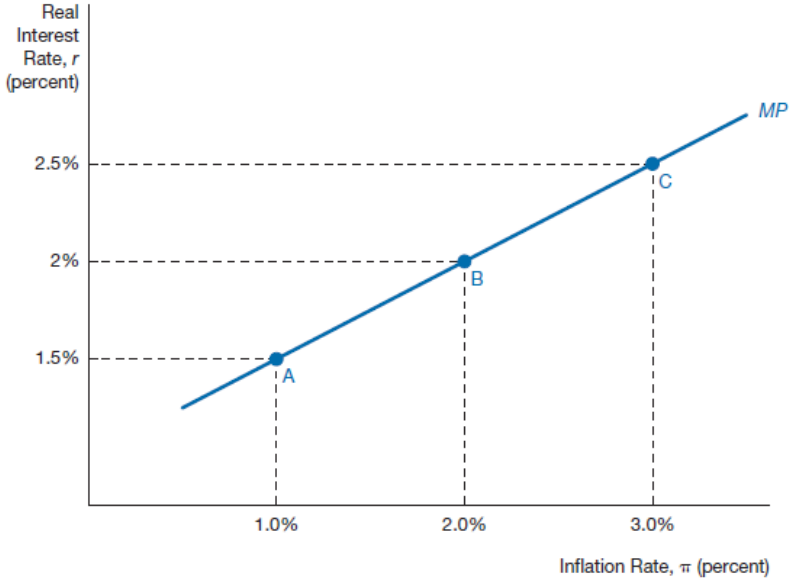
Assets	Liabilities
Change in bond holdings: +$1 million	Change in money stock: +$1 million

9.7 DERIVATION OF MONETARY POLICY CURVE

The monetary policy (MP) curve indicates the relationship between the real interest rate the central bank sets and the inflation rate. We can write this curve as follows:

$$r = \bar{r} + \lambda\pi \qquad (1)$$

Where is the autonomous component of the real interest rate set by the monetary policy $\bar{r}$ authorities, which is unrelated to the current level of the inflation λ rate, while is the responsiveness of the real interest rate to the inflation rate.



At point A where inflation is at 1%, the Federal Reserve sets the real interest rate at 1.5%, while at point B, where inflation is 2%, the Fed sets the real interest rate at 2%, and at point C, where inflation is 3%, the Fed sets the real interest rate at 2.5%.

The line going through points A, B, and C is the monetary policy curve MP, and it is upward sloping, indicating that monetary policy raises real interest rates when the inflation rate rises.

9.7.1 Why the Monetary Policy Curve Has an Upward Slope?

To see why the MP curve has an upward slope, we need to recognize that central banks seek to keep inflation stable. In order to stabilize inflation, monetary policy makers follow the Taylor principle, named after John Taylor of Stanford University, in which they raise nominal rates by more than any rise in expected inflation so that real interest rates rise when there is a rise in inflation, as the MP curve suggests.

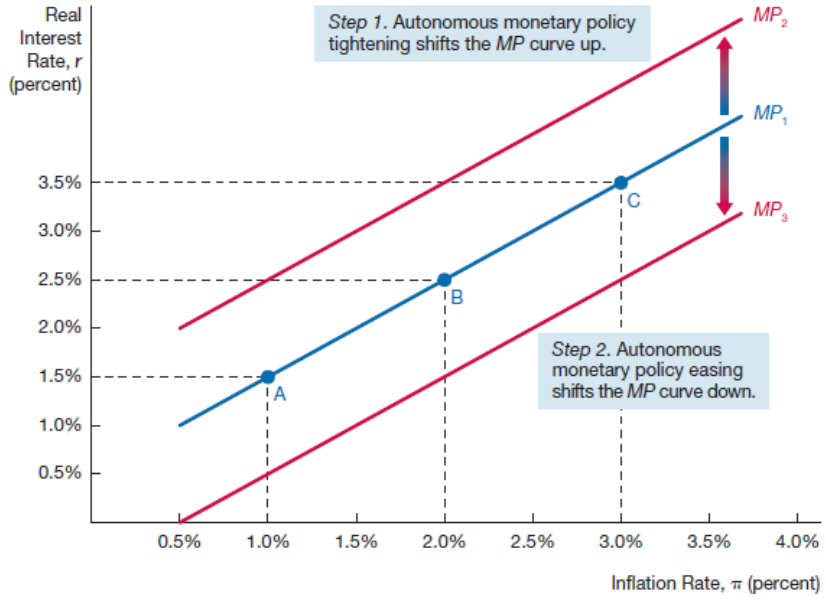
John Taylor and many other researchers have found that monetary policy makers tend to follow the Taylor principle in practice. To see why monetary policy makers, follow the Taylor principle, in which higher inflation results in higher real interest rates, consider what would happen if monetary policy makers instead allowed the real interest rate to fall when inflation rose. In this case, an increase in inflation would lead to a decline in the real interest rate,which would increase aggregate output, which would in turn cause inflation to rise further, which would cause the real interest rate to fall further, increasing aggregate output further. Schematically, we can write this as follows:

$$\pi\uparrow \Rightarrow r\downarrow \Rightarrow Y\uparrow \Rightarrow \pi\uparrow \Rightarrow r\downarrow \Rightarrow Y\uparrow \Rightarrow \pi\uparrow$$

The result would be that inflation would continually keep rising and spin out of control. Indeed, this is exactly what happened in the 1970s, when the Federal Reserve did not raise nominal interest rates by as much as inflation rose, so that real interest rates fell. Inflation accelerated to over 10%.

Shifts in the Monetary Policy Curve

Autonomous changes in monetary policy, such as when a central bank changes the real interest rate at any given inflation rate, shift the *MP* curve. An autonomous tightening of monetary policy that increases the real interest rate shifts the *MP* curve up to MP_2, while an autonomous easing of monetary policy that lowers the real interest rate shifts the *MP* curve down to MP_3.



9.8 SUMMARY

This lesson concludes that the economic stabilization implies minimum possible fluctuations in prices in the domestic market. It also implies that the exchange rate of the country's currency and its liquidity preferences are directly related to the credit creation in the economy. As, we know that the monetary policy is the tool of central bank which controls (i) the supply of money (ii) availability of money (iii) the cost of money or the rate of interest in order to attain macroeconomic stability. Also, the monetary policy multiplier shows how much an increase in real money supply increases equilibrium level of income keeping fiscal policy unchanged and this increase in money supply leads to a monetary expansion which causes a shift in the Aggregate Demand.

9.9 ANSWER TO IN-TEXT QUESTIONS

1. In a scarce reserves system, 3 tools are used to shift the money supply and change the nominal interest rate in the money market. Each of those tools is described below:

   (a) Open Market Operation

   (b) The reserve requirement

(c) The discount rate

As, the contractionary monetary policy is used to fight inflation. In a scare reserve system, a central bank can sell bonds on the open market, increase the discount rate and increase the reserve requirements. Also, such actions will decrease the money supply and increase the nominal interest rates.

On the other hand, the expansionary Monetary policy is used to fight unemployment, as a scare reserve system of the central bank can buy bonds on the open market and decrease the discount rate and the reserve requirements.

2. Since the interest rate directly impacts the quantity of investment and gross investment includes purchases of physical capital, interest rates can impact the growth rate of the economy. Higher interest rates tend to decrease investment and with it the growth rate. Lower interest rates tend to increase investment and growth rate.

3. In expansionary monetary policy the interest rate decreases and lowers the gross investment rate. Also, it leads to a shift in aggregate demand to the right and result into greater real output ratio. Contrary to this In the case of contractionary monetary policy there is increase in interest rate which leads to higher interest value and lower gross investment rate.

9.10 SELF-ASSESSMENT QUESTIONS

1. Distinguish between monetary and fiscal policy?
2. Using the appropriate aggregate demand and supply diagram, evaluate the effect of loosening monetary policy on the economy of a country?
3. Analyze the policy options available to a government that is experiencing both moderate levels of unemployment and inflation.

9.11 REFERENCES

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