MBA - 2nd Semester

MBA-208: MANAGERIAL ECONOMICS-II

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Unit –V: Circular Flow of Income and Concepts of Macro Aggregates: Core concepts of business cycle and phases; National Income Accounting, Three methods of measuring GDP/GNP, concepts in open and closed economy.

Unit –VI: Theory of Income Determination:
a) Simple Keynesian Model: closed economy, concepts of consumption and investment as addition to capital stock, private autonomous expenditure multiplier, introducing the Government – fiscal policy – Government expenditure multiplier, Tax Rate Multiplier, Balanced Budget Multiplier, Extension: Paradox of Thrift (Multiplier Analysis – both mathematical and graphical methods to be discussed.)
b) Introduction of money and asset market: IS-LM: Fiscal policy and monetary policy, comparison of crowding out effects.
c) Introduction to foreign trade :export and import multipliers

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1. National Income Accounting

National income measures the monetary value of the flow of output of goods and services produced in an economy over a period of time.

Measuring the level and rate of growth of national income is important for seeing:

- The rate of economic growth
- Changes to average living standards
- Changes to the distribution of income

Gross Domestic Product

Gross domestic product (GDP) is the total value of output in an economy and is used to measure change in economic activity. GDP includes the output of foreign owned businesses

that are located in a country following foreign direct investment. For example, the output produced at the Nissan car plant on Tyne and Wear and by foreign owned restaurants and banks all contribute to the UK's GDP.

There are 3 ways of calculating GDP all of which should sum to the same amount:

National Income = National Output = National Expenditure (Aggregate Demand)

Methods of Measuring National Income of a Country

There are three methods of measuring national income. Which method is to be used depends on the availability of data in a country and the purpose in hand.

(1) Product Method

(1.a) Final Product Method

According to this method, the total value of final goods and services produced in a country during a year is calculated at market prices. To find out the GNP, the data of all productive activities, such as agricultural products, wood received from forests, minerals received from mines, commodities produced by industries, the contributions to production made by transport, communications, insurance companies, lawyers, doctors, teachers, etc. are collected and assessed at market prices. Only the final goods and services are included and the intermediary goods and services are left out.

(1.b) Value Added Method:

Another method of measuring national income is the value added by industries. The difference between the value of material outputs and inputs at each stage of production is the value added. If all such differences are added up for all industries in the economy, we arrive at the gross domestic product.

The Value Added and contributions to National Income

- There are four main wealth-generating sectors of the economy: manufacturing, oil and gas, farming, forestry and fishing and a wide range of service-sector industries.
- This measure of GDP adds together the value of output produced by each of the productive sectors in the economy using the concept of value added**.**

Value added is the increase in the value of goods or services as a result of the production process

Value added = Value of production - Value of intermediate goods

Let us say that you buy a ham and mushroom pizza from Dominos at a price of £14.99 - this is the final retail price and will count as consumption.

The pizza has many ingredients at different stages of the supply chain, for example tomato growers, dough, mushroom farmers plus the value created by Dominos themselves as they put the pizza together and get it to the consumer.

Some products have a low value-added, for example those really cheap tee-shirts that you might find in a supermarket for little more than £5. These are low cost, high volume, low priced products.

Other goods and services are such that lots of value can be added as we move from sourcing the raw.

(2) Income Method

According to this method, the net income payments received by all citizens of a country in a particular year are added up, i.e., net incomes that accrue to all factors of production by way of net rents, net wages, net interest and net profits are all added together but incomes received in the form of transfer payments are not included in it. The data pertaining to income are obtained from different sources, for instance, from income tax department in respect of high income groups and in case of workers from their wage bills.

Here GDP is the sum of the incomes earned through the production of goods and services. This is:

Income from people in jobs and in self-employment + Profits of private sector businesses + Rent income from the ownership of land = Gross Domestic product (by factor incomes)

Only those incomes that come from the production of goods and services are included in the calculation of GDP by the income approach. We exclude:

(i) Transfer payments e.g. the state pension; income support for families on low incomes; the Jobseekers' Allowance for the unemployed and welfare assistance, such housing benefit.

(ii) Private transfers of money from one individual to another.

(iii) Income not registered with the Inland Revenue or Customs and Excise. Every year, billions of pounds worth of activity is not declared to the tax authorities.**

This is known as the shadow economy or black economy. According to a World Bank report published in 2010, the average size of the shadow economy (as a percentage of official gross domestic product) in Sub-Saharan Africa was 38%; in Europe and Central Asia (mostly transition countries), it was 36%, and in high-income OECD countries it was 13% Published figures for GDP by factor incomes will be inaccurate because much activity is not officially recorded, including subsistence farming,** barter transactions and the shadow economy. Many African countries in particular have trouble measuring the size of their relatively large subsistence economies and unrecorded economic activity.

(3) Expenditure Method

According to this method, the total expenditure incurred by the society in a particular year is added together and includes personal consumption expenditure, net domestic investment, government expenditure on goods and services, and net foreign investment. This concept is based on the assumption that national income equals national expenditure.

The full equation for GDP using this approach is GDP = C + I + G + (X-M) where

- C: Household spending
- I: Capital Investment spending
- G: Government spending
- X: Exports of Goods and Services
- M: Imports of Goods and Services

2. The Circular Flow of Income and Expenditure

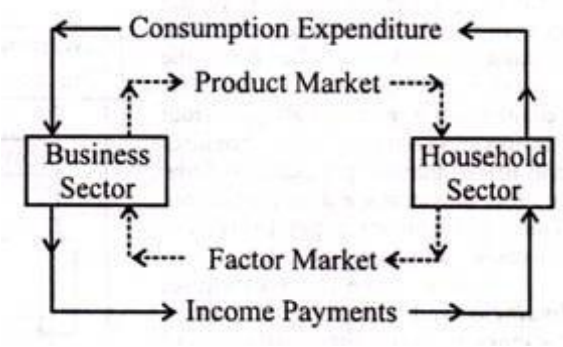
The circular flow of income and expenditure refers to the process whereby the national income and expenditure of an economy flow in a circular manner continuously through time. The various components of national income and expenditure such as saving, investment,

taxation, government expenditure, exports, imports, etc. are shown on diagrams in the form of currents and cross-currents in such a manner that national income equals national expenditure.

2.1 Circular Flow in an Economy with Two Sectors: Household and Business

We begin with a simple hypothetical economy where there are only two sectors, the household and business. The household sector owns all the factors of production, that is, land, labour and capital. This sector receives income by selling the services of these factors to the business sector.

Figure 1



The business sector consists of producers who produce products and sell them to the household sector or consumers. Thus the household sector buys the output of products of the business sector. The circular flow of income and expenditure in such an economy is shown in Figure 1 where the product market is shown in the upper portion and the factor market in the lower portion.

In the product market, the household sector purchases goods and services from the business sector while in the factor market the household sector receives income from the former for providing services. Thus the household sector purchases all goods and services provided by the business sector and makes payments to the latter in lieu of these.

The business sector, in turn, makes payments to the households for the services rendered by the latter to the business-wage payments for labour services, profit for capital supplied, etc. Thus payments go around in a circular manner from the business sector to the household sector and from the household sector to the business sector, as shown by arrows in the output portion of the figure.

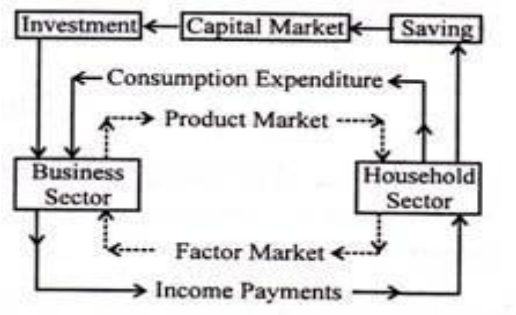
There are also flows of goods and services in the opposite direction to the money payments flows. Goods flow from the business sector to the household sector in the product market, and services flow from the household sector to the business sector in the factor market, as shown in the inner portion of the figure. These two flows give GNP = GNI.

2.2 Circular Flow in an Economy with Saving and Investment

The actual economy is not as explained above. In an economy, "inflows" and "leakages" occur in the expenditure and income flows. Such leakages are saving, and inflows or injections are investment which equals each other.

Figure 2 shows how the circular flow of income and expenditure is altered by the inclusion of saving and investment.

Figure 2



Expenditure has now two alternative paths from household and product markets:

(i) Directly via consumption expenditure, and
(ii) Indirectly via investment expenditure.

In Figure 2 there is a capital or credit market in between saving and investment flows from households to business firms. The capital market refers to a number of financial institutions such as commercial banks, savings banks, loan institutions, the stock and bond markets, etc. The capital market coordinates the saving and investment activities of the households and the business firms. The households supply saving to the capital market and the firms, in turn, obtain investment funds from the capital market.

2.3 Circular Flow in an Economy with Government Sector

So far we have been working on the circular flow of a two-sector model of an economy. To this we add the government sector so as to make it a three-sector closed model of circular flow of income and expenditure. For this, we add taxation and government purchases (or expenditure) in our presentation. Taxation is a leakage from the circular flow and government purchases are injections into the circular flow.

First, take the circular flow between the household sector and the government sector. Taxes in the form of personal income tax and commodity taxes paid by the household sector are outflows or leakages from the circular flow.

But the government purchases the services of the households, makes transfer payments in the form of old age pensions, unemployment relief, sickness benefit, etc., and also spends on them to provide certain social services like education, health, housing, water, parks and other facilities. All such expenditures by the government are injections into the circular flow.

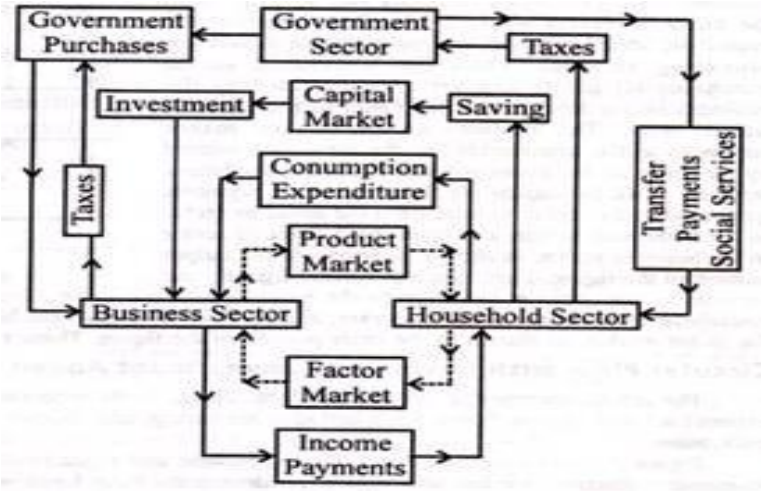
Next take the circular flow between the business sector and the government sector. All types of taxes paid by the business sector to the government are leakages from the circular flow. On the other hand, the government purchases all its requirements of goods of all types from the business sector, gives subsidies and makes transfer payments to firms in order to encourage their production. These government expenditures are injections into the circular flow.

Now we take the household, business and government sectors together to show their inflows and outflows in the circular flow. As already noted, taxation is a leakage from the circular flow. It tends to reduce consumption and saving of the household sector. Reduced consumption, in turn, reduces the sales and incomes of the firms. On the other hand, taxes on business firms tend to reduce their investment and production.

The government offsets these leakages by making purchases from the business sector and buying services of the household sector equal to the amount of taxes. Thus total sales again equal production of firms. In this way, the circular flows of income and expenditure remain in equilibrium.

Figure 3 shows that taxes flow out of the household and business sectors and go to the government. Now the government makes investment and for this purchases goods and services from firms and also factors of production from households, thus government purchases of goods and services are an injection in the circular flow of income and taxes are leakages.

Figure 3



If government purchases exceed net taxes then the government will incur a deficit equal to the difference between the two, i.e., government expenditure and taxes. The government finances its deficit by borrowing from the capital market which receives funds from households in the form of saving.

On the other hand, if net taxes exceed government purchases the government will have a budget surplus. In this case, the government reduces the public debt and supplies funds to the capital market which are received by firms.

2.4 Circular Flow in an Economy with External Sector

So far the circular flow of income and expenditure has been shown in the case of a closed economy. But the actual economy is an open one where foreign trade plays an important role. Exports are an injection or inflows into the economy.

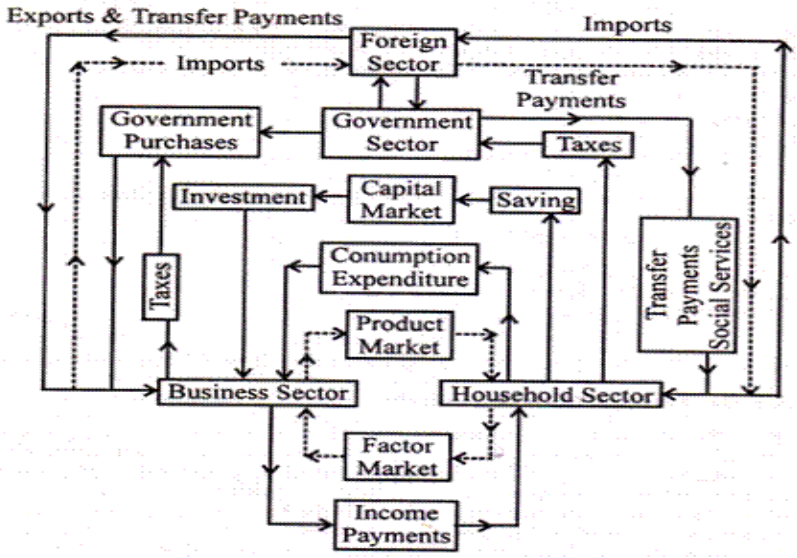
They create incomes for the domestic firms. When foreigners buy goods and services produced by domestic firms, they are exports in the circular flow of income. On the other hand, imports are leakages from the circular flow. They are expenditures incurred by the household sector to purchase goods from foreign countries. These exports and imports in the circular flow are shown in Figure 4.

Take the inflows and outflows of the household, business and government sectors in relation to the foreign sector. The household sector buys goods imported from abroad and makes payment for them which is a leakage from the circular flow. The households may receive

transfer payments from the foreign sector for the services rendered by them in foreign countries.

On the other hand, the business sector exports goods to foreign countries and its receipts are an injection in the circular flow. Similarly, there are many services rendered by business firms to foreign countries such as shipping, insurance, banking, etc. for which they receive payments from abroad.

Figure 4



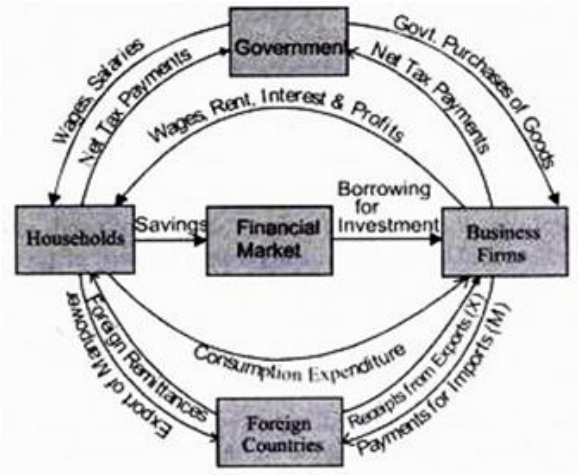
They also receive royalties, interests, dividends, profits, etc. for investments made in foreign countries. On the other hand, the business sector makes payments to the foreign sector for imports of capital goods, machinery, raw materials, consumer goods, and services from abroad. These are the leakages from the circular flow.

Like the business sector, modern governments also export and import goods and services, and lend to and borrow from foreign countries. For all exports of goods, the government receives payments from abroad. Similarly, the government receives payments from foreigners when they visit the country as tourists and for receiving education, etc. and also when the government provides shipping, insurance and banking services to foreigners through the state-owned agencies. It also receives royalties, interest, dividends etc. for investments made abroad. These are injections into the circular flow. On other hand, the leakages are payments made for the purchase of goods and services to foreigners.

Figure 4 shows the circular flow of the four-sector open economy with saving, taxes and imports shown as leakages from the circular flow on the right hand side of the figure, and

investment, government purchases and exports as injections into the circular flow on the left side of the figure.

Figure 4 (Supplementary)



Further, imports, exports and transfer payments have been shown to arise from the three domestic sectors—the household, the business and the government. These outflows and inflows pass through the foreign sector which is also called the "Balance of Payments Sector." If exports exceed imports, the economy has a surplus in the balance of payments. And if imports exceed exports, it has a deficit in the balance of payments. But in the long run, exports of an economy must balance its imports. This is achieved by the foreign trade policies adopted by the economy.

2.5 National Income Identity from Circular flow Diagram

The above analysis can be shown in simple two equations as following:

$Y = C + I + G + (X - M)$ (1)

Where, Y represents the production of goods and services, C for consumption expenditure, I investment level in the economy, G for government expenditure respectively, X is export and M is import and (X –M) represents net export.

Now we introduce taxation in the model to equate the government expenditure with external sector.

Therefore, $Y = C + S + T + R_f$ (2)

Where, S is saving, T is taxation, R_f is net transfer payment to aboard.

The above equation (1) and (2) represent National Income Identity of a country with government and external sector from demand and supply side respectively.

By equating (1) and (2), we get

$C + I + G + (X – M) = Y = C + S + T + R_f$

So in equilibrium we have:

$I + G + (X – M) = S + T + R_f$

The equation shows the equilibrium condition in the circular flow of income and expenditure.

Now if we consider the country without external sector or the country where $(X – M) = R_f$, then the equilibrium condition would be:

$I + G = S + T$

2.6 Some Advance Measures of National Income

There are various concepts of National Income. The main concepts of NI are: GDP, GNP, NNP, NI, PI, DI, and PCI. These different concepts explain about the phenomenon of economic activities of the various sectors of the various sectors of the economy minutes

Gross Domestic Product (GDP)

The most important concept of national income is Gross Domestic Product. Gross domestic product is the money value of all final goods and services produced within the domestic territory of a country during a year.

Algebraic expression under product method is,

$GDP = \sum P Q$

where, GDP = Gross Domestic Product
P = Price of goods and service
Q = Quantity of goods and service
denotes the summation of all values.

According to expenditure approach, GDP is the sum of consumption, investment, government expenditure, net foreign exports of a country during a year.

Algebraic expression under expenditure approach is,

GDP = C + I + G + (X-M)
Where,
C = Consumption expenditure
I = Investment expenditure
G = Government expenditure
(X-M) = Export minus import

GDP includes the following types of final goods and services. They are:

1. Consumer goods and services.
2. Gross private domestic investment in capital goods.
3. Government expenditure.
4. Exports and imports.

Gross National Product (GNP)
Gross National Product is the total market value of all final goods and services produced annually in a country plus net factor income from abroad. Thus, GNP is the total measure of the flow of goods and services at market value resulting from current production during a year in a country including net factor income from abroad. The GNP can be expressed as the following equation:

GNP = GDP + NFIA (Net Factor Income from Abroad)
or, GNP = C + I + G + (X - M) + NFIA

Hence, GNP includes the following:

1. Consumer goods and services.
2. Gross private domestic investment in capital goods.
3. Government expenditure.
4. Net exports (exports-imports).
5. Net factor income from abroad.

Net National Product (NNP)
Net National Product is the market value of all final goods and services after allowing for

depreciation. It is also called National Income at market price. When charges for depreciation are deducted from the gross national product, we get it. Thus,

NNP = GNP - Depreciation
or, NNP = C + I + G + (X-M) + NFIA - Depreciation

National Income (NI)
National Income is also known as National Income at factor cost. National income at factor cost means the sum of all incomes earned by resources suppliers for their contribution of land, labour, capital and organizational ability which go into the years net production. Hence, the sum of the income received by factors of production in the form of rent, wages, interest and profit is called National Income. Symbolically,

NI = NNP + Subsidies - Interest Taxes
or, GNP –Depreciation + Subsidies - Indirect Taxes
or, NI=C+G+I+(X-M)+NFIA-Depreciation-Indirect Taxes + Subsidies

Personal Income (PI)
Personal Income i s the total money income received by individuals and households of a country from all possible sources before direct taxes. Therefore, personal income can be expressed as follows:

PI = NI - Corporate Income Taxes - Undistributed Corporate Profits - Social Security Contribution + Transfer Payments

Disposable Income (DI)
The income left after the payment of direct taxes from personal income is called Disposable Income. Disposable income means actual income which can be spent on consumption by individuals and families. Thus, it can be expressed as:

DI = PI - Direct Taxes
From consumption approach,
DI = Consumption Expenditure + Savings

Per Capita Income (PCI): Per Capita Income of a country is derived by dividing the national income of the country by the total population of a country. Thus,

PCI = Total National Income ÷ Total National Population

4. Equilibrium Income Determination

4.1 Determination of Equilibrium Level of National Income (Approach 1)

It is worth noting here that the Keynesian theory is relevant in the context of the short run only since the stock of capital, techniques of production, efficiency of labour, the size of population, forms of business organisation have been assumed to remain constant in this theory.

Further in his model of income determination Keynes assumed that price level in the economy remains unchanged. Therefore, in the Keynesian theory which deals with the short run, the level of income of the country will change as a result of changes in the level of labour employment.

As level of employment is determined by aggregate demand and aggregate supply, the level of income is also determined by aggregate demand and aggregate supply. In this article, we shall explain how the equilibrium level of national income is determined through Keynes's income-expenditure analysis.

This analysis explains determination of national income by relating income (output) to aggregate expenditure on goods and services. The, aggregate expenditure shows aggregate demand for goods and services. Keynesian theory of income determination can be explained by assuming two sectors in the economy, namely, households and business firms. Keynes focused on this simple two sector model of determination of national income and derived conclusions regarding policy formulation from this basic model.

Analysis of determination of national income can be extended to incorporate Government and foreign trade. We start with the analysis of determination of national income by taking a simple two-sector economy with a fixed price level.

4.1.1 Aggregate Expenditure

Aggregate expenditure is the total expenditure which at given fixed prices all households and business firms want to make on goods and services in a period at various levels of national

income. Though J.M. Keynes used the term aggregate demand, in modern macroeconomics, the term aggregate expenditure is generally used.

The terms of aggregate demand and aggregate supply are now generally used in the model with variable price level. In this article however we use the term aggregate demand and aggregate expenditure interchangeably but assume that price level remains constant.
In a two-sector closed economy, aggregate expenditure or aggregate demand consists of two components: First, there is consumption demand, and secondly, there is a demand for capital goods, which is called investment demand. Thus, by aggregate expenditure we mean how much expenditure the households and the entrepreneurs are willing to undertake on consumption and investment. Therefore,

Aggregate Demand = Consumption Demand + Investment Demand

AD = Y = C + l

Where, AD stands for aggregate demand, C for consumption demand and I for investment demand.

Using the term aggregate expenditure instead of aggregate demand we have

Aggregate Expenditure = Consumption expenditure + Investment expenditure

Or, AE = C + I

4.1.2 Consumption Demand

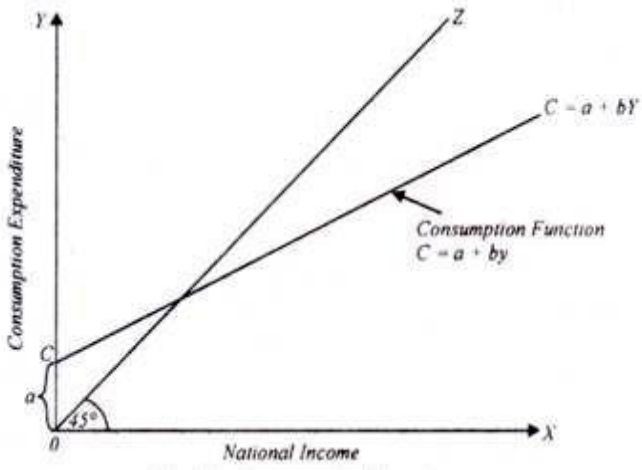
As for consumption demand, it depends upon the propensity to consume of the community and the level of national income. Given the propensity to consume, as income increases, consumption demand will also increase. In other words, given the propensity to consume, consumption demand is a function of income.

Consumption function can take several forms. The most common form of short-run consumption function is where ‘a’ is the intercept term of the function and represents autonomous consumption whereas b represents the slope of the consumption function.

$$C= a + bY$$

According to Keynes's theory current consumption expenditure depends primarily on current income. Further, according to Keynes, the chief factor that determines consumption expenditure is disposable income, that is, income, available after taxes. Increase in personal taxes reduces personal disposable income and therefore consumption expenditure.

Figure 5: Consumption Function



Consider the above figure 5 in which national income is measured along the X-axis and consumption demand (C) is shown on the Y-axis. In this figure, a straight line OZ which makes 45° angle with the X-axis has been drawn.

This straight line OZ with 45° angle with the X-axis represents the reference income line to measure the difference between consumption and level of income. This is also often called income line. This 45° line represents national income in money terms. In fact, national product and income are the same things. In this figure a curve C has also been drawn which represents consumption function, C = a + by of the community.

This curve of consumption function slopes upward from left to right, which shows that as income increases, the amount of consumption demand also increases. As income line OZ makes 45° angle with the X-axis, the gap between the consumption function curve C and the income line OZ represents the saving of the community.

The reason for this is that a part of the income is consumed and a part is saved, i.e., National Income = Consumption + Saving. This is also written as Y = C + S, where y represents income, C consumption and S saving. It will be seen from figure 5 that the gap between the

consumption function curve C and the income line OZ goes on increasing as income increases. In other words, the amount of saving or saving gap increases as income increases.

It is worth mentioning that in the short-run consumption function does not change. This is because the propensity to consume, that is, the whole consumption function curve C depends upon the tastes, preferences, the income distribution in the society, the population level, wealth of the people etc., which do not undergo much change in the short run. The implication of the stability of consumption function is that the consumption demand is primarily determined by the level of current national income.

However, through changes in monetary policy and fiscal policy by the Government the consumption function can be shifted. For example, when rate of interest, an instrument of monetary policy, is reduced, the people borrow more for durable consumer goods such as cars, air conditioners, houses and with this at a given level of income consumption demand increases causing upward shift in the consumption function curve.

Similarly, when income tax, an instrument of fiscal policy, is reduced disposable income of the households increase and as a result at a given level of national income (GDP), consumption demand rises, leading to the upward shift in consumption function.

4.1.3 Investment Demand

The other component of the aggregate demand is investment which is a crucial factor in the determination of equilibrium level of national income.

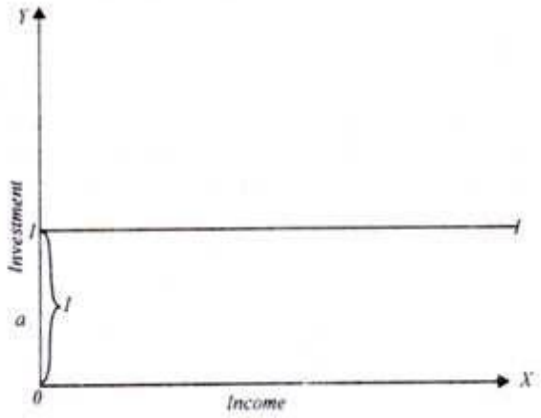
Investment demand depends upon two factors:
(1) Marginal efficiency of capital and
(2) Rate of interest.

Of these two factors, rate of interest is comparatively stable and does not frequently change in the short run. Therefore, the fluctuations in the level of investment demand chiefly depend upon the changes in the marginal efficiency of capital.

The marginal efficiency of capital means the expected rate of profit which the business community hopes to get from the investment in capital figure 6 Marginal efficiency of capital

depends upon the replacement cost of the capital goods on the one hand, and profit expectations of entrepreneurs on the other.

Figure 6: Investment Function



Profit expectations are more important because they often change even in the short run and cause fluctuations in investment. If the level of national income and employment is desired to be raised in a free market capitalist economy, then steps should be taken which will raise the expectations of the entrepreneurs (i.e., business firms) regarding profit-earning from investment.

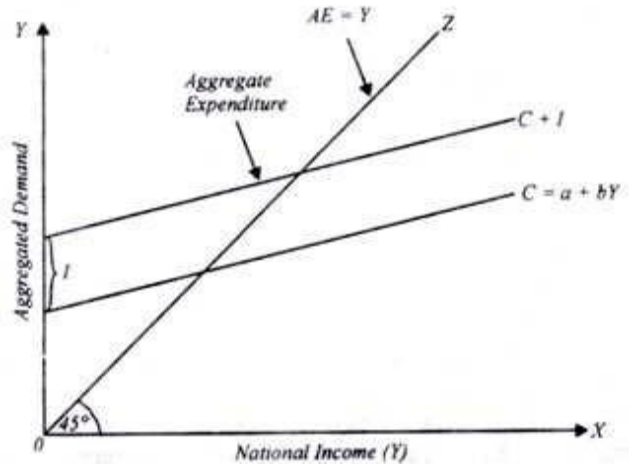
In any particular year, there will be a given level of investment demand which, as seen above, is determined by marginal efficiency of capital and a given rate of interest. However, in Keynes's theory investment being determined by marginal efficiency of capital and rate of interest does not depend on the level of income.

Thus, in Keynesian theory of income determination, investment does not vary with change in income. In other words, in Keynes 'income-expenditure analysis investment is treated as autonomous of income, that is, investment does not change with a change in the level of income.

In actual practice when the level of income rises, the demand for goods will also rise and this will favourably affect the expectations of the entrepreneurs regarding making of profits. Rise in the profit expectations will raise the marginal efficiency of capital which in turn will increase the level of investment. But it is quite clear that investment demand does not directly depend upon income; it is only affected indirectly by changes in income.

Therefore, in our figure 7 we have taken a given amount of investment demand independent of the level of income and added it to upward sloping consumption function curve to get aggregate expenditure curve C + I. The distance between the C curve and the C + I curve is parallel to the C curve throughout which indicates that the level of investment is constant and does not change with the change in income.

Figure 7: Aggregate Demand Curve



It may however be noted that with either a change in the rate of interest or marginal efficiency of capital investment will change. Therefore, in income-expenditure diagram as shown in figure 7, a different new amount of investment of will have to be taken.

4.1.4 Aggregate Output

As mentioned above, in the short run the level of national income and employment in a free-market economy depends upon the equilibrium between aggregate expenditure and aggregate output. We have also explained above the various components of aggregate expenditure on goods and services. We now run to explain the aggregate supply and factors on which it depends. It is important to note again that Keynes in his analysis assumed that prices and wages remain constant in the short run.

In an economy without any role of Government, national income means the total money value of goods and services produced in an economy in a year.

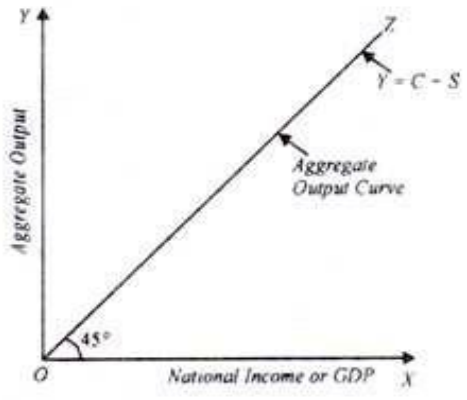
4.1.5 The 45° Line as Aggregate Output Curve

In the income-expenditure analysis with which we are presently concerned we need to compare Gross Domestic Product (or National Income) with aggregate expenditure (AE), also called aggregate demand (AD), which is represented on the vertical axis.

For this purpose we draw a 45° line from the origin which helps us to transfer Gross Domestic Product or real National Income (i.e. gross supply of output at constant prices) from the horizontal axis to the vertical axis for comparing it with total expenditure on goods and services.

At every point of this 45° line from the origin, the vertical distance equals horizontal distance which measures real national income or GDP which is generally denoted by Y. This 45° line is also called income line along which Y = C + S because income can either be consumed or saved.

Figure 8



The essential feature which emerges from all this is that more output will be produced and supplied at the given price level in response to increase in aggregate demand or expenditure. In other words whatever the aggregate demand more output of goods will be produced and supplied at the same price before full-employment of resources is reached.

This type of aggregate supply curve has been shown by 45° OZ line drawn against the X and Y axes in figure 8 where along the X- axis real national income (GDP) and along the T-axis aggregate supply of output is measured. However, as noted above, aggregate output and real national income (GDP) are identical.

It follows from above that 45° line shows two things. First, it shows varying levels of aggregate production or the supply of goods (both consumer and capital goods) that will be

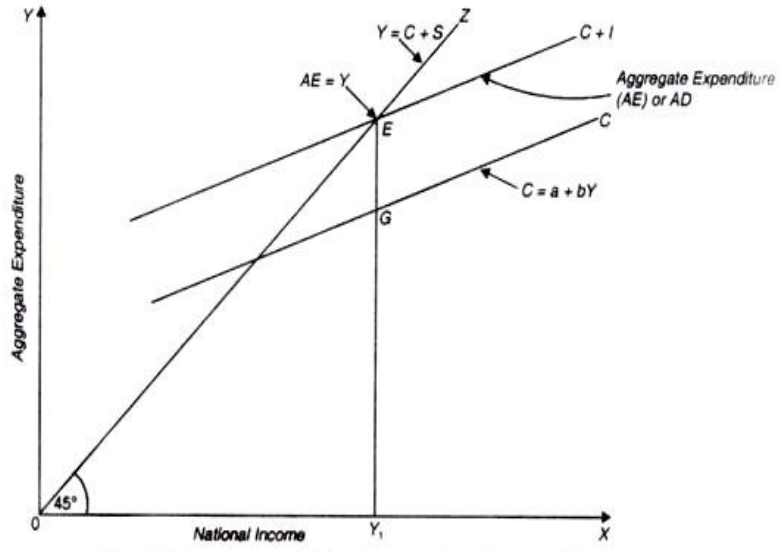
offered for sale at the given price level at various levels of aggregate expenditure. This shows that up to the level of full-employment of resources any amount of aggregate supply of output will be forthcoming at the given price level depending on the aggregate demand or expenditures.

The greater the aggregate demand or expenditure, the greater the aggregate supply of output at the given price level. Secondly, it represents national income. In fact, as you would have read in national income accounting, national product and national income are the same things.

4.1.6 Equilibrium Level of National Income

Now, we shall explain how through the intersection of aggregate demand and aggregate supply curves the equilibrium level of national income is determined in Keynes's two sector model. C + I curve represents the aggregate expenditure and 45° OZ line represents aggregate supply of output.

Figure 9: Equilibrium Income Determination



Normally the goods and services are produced by firms when they think they can sell them in the market. There will be equilibrium in the goods market when total output of goods and services produced will be equal to the total demand for output. Aggregate demand for them is represented by aggregate expenditure. In equilibrium aggregate expenditure (which is denoted by AE) must equal aggregate output (GDP). Since aggregate output or GDP equals national income (K) we have the following condition for equilibrium.

$$AE = GDP = Y$$

It will be seen in figure 9 that aggregate expenditure curve (AE) or C + I curve intersects 45° line at point E which satisfies the equilibrium condition. That is, a point E which corresponds to the income level OY_1 aggregate expenditure is equal to aggregate output. Therefore, E is the equilibrium point and OY_1 represents the equilibrium level of national income. Now, income cannot be in equilibrium at levels smaller than OY_1, since aggregate expenditure exceeds aggregate supply of output as C+I curve which depicts aggregate expenditure of output lies above 45° line.

This excess demand will be met by the firms selling goods from their stocks or inventories of goods kept by them. This leads to the decline in inventories of goods below the desired levels. This unintended fall in inventories will induce the firms to expand their output of goods and services to meet the extra demand for them and keep their inventories of goods at the desired levels.

Thus when at a given level of national income, aggregate expenditure (i.e., aggregate demand) exceeds aggregate output and national income will increase. With this increase in national income or output, employment of labour will also rise to produce the increment in output. This process of expansion in output under the pressure of excess demand will continue till national income OY_1 is reached.

On the country, the equilibrium level of national income cannot be greater than OY_1 because at any level greater than OY_1 aggregate expenditure or demand (C + I) falls short of aggregate output. This will cause the increase in inventories of goods with the firms beyond the desired levels.

To this situation of the unintended increase in inventories of goods, the firms will respond by cutting down production to keep their inventories at the desired levels. Thus, deficiency in aggregate demand relative to the aggregate supply of output will lead to the fall in national income and output until the level OY_1 is reached where aggregate expenditure (C +I) is equal to the value of aggregate output. Thus, OY_1 is the equilibrium level of national income.

4.2 Determination of Equilibrium Level of National Income (Approach 2)

A study of how the level of national income is determined will become clearer by using simple mathematics. The level of national income is in equilibrium at which aggregate demand equals aggregate supply of output.

In a simple model of income determination in which we do not consider the impact of Government expenditure and taxation and also exports and imports, the national income is the sum of consumption demand (C) and investment demand (I), that is:

$Y = C + I$

Where, Y stands for the level of national income.

Suppose the consumption function is of the following form:

$C = a + bY$

Where a is the intercept term in the consumption function and therefore represents the autonomous consumption expenditure which does not very with income, b is a constant which represents the marginal propensity to consume (MPC = $\Delta C/\Delta Y$). Thus total consumption demand is equal to the sum of autonomous consumption expenditure (a) and the induced consumption expenditure (bY).

Now suppose that investment demand equals I_a. This investment I_a is autonomous because this does not depend on income. Thus, we get the following three equations for the determination of the equilibrium level of national income.

$Y = C + I$
$C = a + bY$
$I = I_a$

Substituting the values of C and I in equation (i) we have
$Y = a + bY + I_a$
$Y - bY = a + I_a$
$Y (I - b) = a + I_a$
$Y = (a + I_a) / (I - b)$

The equation (v) shows the equilibrium level of national income when aggregated demand equals aggregate supply. The equation reveals that autonomous consumption and autonomous

investment ($a + I_a$) generates so much expenditure or aggregate demand which is equal to the income generated by the production of goods and services. From the equation it also follows that the equilibrium level of national income can be known from multiplying the elements of autonomous expenditure (that is, $(a + I_a)$) by the term 1/(1-b) which is equal to the value of multiplier.

The multiplier tells us how much increase in income occurs when autonomous investment (or consumption) increases by Re.1, that is, multiplier is $\Delta Y/\Delta I$ and its value is equal to 1/(1-b) where b stands for marginal propensity to consume (MPC). Thus, multiplier $\Delta Y/\Delta I = 1/(1-b)$. Further, it also follows that equilibrium level of income is higher, the greater the marginal propensity to consume (i.e. b) and autonomous investment (I).

Now, higher the marginal propensity to consume (b) leads to greater the value of multiplier. For example, if marginal propensity to consume (b) is 0.8, investment multiplier is

$\Delta Y/\Delta I = 1/(1-08) = 1/0.2 = 5$

If MPC or b = 0.75, multiplier is = $\Delta Y/\Delta I = 1/(1-0.75) = 1/0.25 = 100/25 = 4$

We can find out the increase in income (ΔY) resulting from a certain increase in investment (ΔI) by using this multiplier relationship. Thus

$\Delta Y/\Delta I = 1/(1-b)$

$\Delta Y = \Delta I/(1-b)$

If marginal propensity to consume (MPC) is equal to 0.8, with the increase in investment by Rs. 100 crore the increase in income will be:
$\Delta Y/\Delta I = 1/(1-b)$
$\Delta Y = \Delta I/1-b = 100/(1-0.8) = 500$ crore

4.2.1 Determination of Equilibrium Level of Income

According to the Keynesian Theory, equilibrium condition is generally stated in terms of aggregate demand (AD) and aggregate supply (AS). An economy is in equilibrium when aggregate demand for goods and services is equal to aggregate supply during a period of time.
So, equilibrium is achieved when:

AD = AS …..... (1)

We know, AD is the sum total of Consumption (C) and Investment (I):

AD = C + I … (2)

Also, AS is the sum total of consumption (C) and saving (S):

AS = C + S … (3)

Substituting (2) and (3) in (1), we get:

C + S = C + I

Or, S = I

It means, according to Keynes, there are Two Approaches for determining the equilibrium level of income and employment in the economy:

It must be noted that Equilibrium level of income and employment can also be determined according to 'Classical Theory'. However, the scope of syllabus is limited to the Keynesian theory.

Equilibrium Income Determination: Two Sub-Approaches

The two approaches to determine equilibrium level of income, output and employment in the economy are:

1. Aggregate Demand-Aggregate Supply Approach (AD-AS Approach)
2. Saving-Investment Approach (S-I Approach)

It must be kept in mind that AD, AS, Saving and Investment are all planned or ex-ante variables.

Before we proceed further, let us first state the various assumptions made in determination of equilibrium output:

(i) The determination of equilibrium output is to be studied in the context of two-sector model (households and firms). It means, it is assumed that there is no government and foreign sector.

(ii) It is assumed that investment expenditure is autonomous, i.e. investments are not influenced by level of income.

(iii) Price level is assumed to remain constant.

(iv) Equilibrium output is to be determined in context of short-run.

4.2.1.1 Aggregate Demand-Aggregate Supply Approach

According to the Keynesian theory, the equilibrium level of income in an economy is determined when aggregate demand, represented by C + I curve is equal to the total output (Aggregate Supply or AS).

Aggregate demand comprises of two components:

1. Consumption expenditure (C)

It varies directly with the level of income, i.e. consumption rises with increase in income.

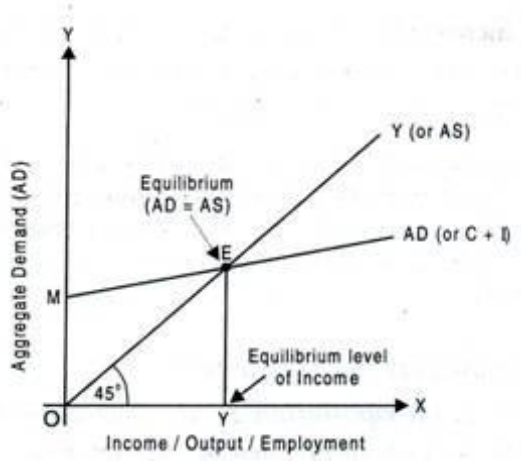
2. Investment expenditure (I)

It is assumed to be independent of the level of income, i.e. investment expenditure is autonomous. So, AD curve is represented by (C + I) curve in the income determination analysis. Aggregate supply is the total output of goods and services of the national income. It is depicted by a 45° line. Since the income received is either consumed or saved, the

AS curve is represented by the (C + S) curve.

The determination of equilibrium level of income can be better understood with the help of the following schedule and diagram:

Figure 10



In figure 10, the AD or (C +1) curve shows the desired level of expenditure by consumers and firms corresponding to each level of output. The economy is in equilibrium at point 'E' where (C + I) curve intersects the 45° line. So,

1. 'E' is the equilibrium point because at this point, the level of desired spending on consumption and investment exactly equals the level of total output.

2. OY is the equilibrium level of output corresponding to point E.
3. It is a situation of 'Effective Demand'. Effective demand refers to that level of AD which becomes 'effective' because it is equal to AS.

If there is any deviation from the equilibrium level of output, i.e. when planned spending (AD) is not equal to planned output (AS), then a process of readjustment will start in the economy and the output will tend to adjust up or down until AD and AS are equal again.
When planned spending (AD) is more than planned output (AS), then (C + I) curve lies above the 45° line. It means that consumers and firms together would be buying more goods than firms are willing to produce. As a result, the planned inventory would fall below the desired level.

To bring the inventory back to the desired level, firms would resort to increase in employment and output until the economy is back at output level OY, where AD becomes equal to AS and there is no further tendency to change.

When AD is less than AS

When AD < AS, then (C +1) curve lies below the 45° line. It means that consumers and firms together would be buying less goods than firms are willing to produce. As a result, the planned inventory would rise. To clear the unwanted increase in inventory, firms plan to decrease the employment and output until the economy is back at output level OY, where AD becomes equal to AS and there is no further tendency to change.

It must be noted that equilibrium level may or may not be at the level of full employment, i.e. equilibrium is possible even at a level lower than the full employment level.

4.2.1.2 Saving-Investment Approach (S-l Approach)

According to this approach, the equilibrium level of income is determined at a level, when planned saving (S) is equal to planned investment (I).

Let us understand this with the help of following schedule and diagram:
In figure 11, Investment curve (I) is parallel to the X-axis because of the autonomous character of investments. The Saving curve (S) slopes upwards showing that as income rises, saving also rises. So:

1. The economy is in equilibrium at point ‘E’ where saving and investment curves intersect each other.
2. At point ‘E’, ex-ante saving is equal to ex-ante investment.
3. OY is the equilibrium level of output corresponding to point E.

If there is any deviation from the equilibrium level of income, i.e., if planned saving is not equal to the planned investment, then a process of readjustment will start which will bring the economy back to the equilibrium level.

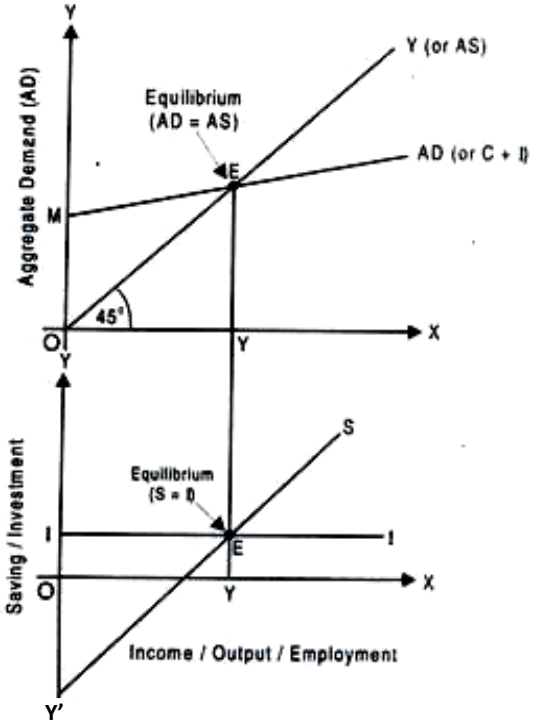
When saving is more than Investment

If planned saving is more than planned investment, i.e. after point ‘E’ in figure 11, it means that households are not consuming as much as the firms expected them to. As a result, the inventory rises above the desired level. To clear the unwanted increase in inventory, firms would plan to reduce the production till saving and investment become equal to each other.

When saving is less than Investment

If planned saving is less than planned investment, i.e. before point ‘E’ in figure 11, it means that households are consuming more and saving less than what the firms expected them to. As a result, planned inventory would fall below the desired level. To bring the inventory back to the desired level, firms would plan to increase the production till saving and investment become equal to each other.

Figure 11



4.3 Determination of Equilibrium Level of National Income (Approach 3)

Two, Three and Four Sector Model of Equilibrium Income Determination

To simplify the analysis, it has been classified into a two-sector model, a three-sector model and a four-sector model.

First two sectors are related to a closed economy in which there is no foreign trade and the last sector is concerned with the open economy.

4.3.1 Two-Sector Model

A two-sector model of income determination of an economy consists only of domestic and business sectors.

The income determination in a closed economy is based on the following assumptions:

1. It is a two-sector economy where only consumption and investment expenditures take place. Thus the total output of the economy is the sum of consumption and investment expenditure.
2. Investment relates to net investment after deducting depreciation.
3. It is a closed economy in which there are no exports or imports.

4. There are no corporate firms in the economy so that there are no corporate undistributed profits.
5. There are no business taxes, no income taxes and no social security taxes so that disposable personal income equals NNP.
6. There are no transfer payments.
7. There is no government.
8. There is autonomous investment.
9. The economy is at less than full employment level of output.
10. The price level remains constant up to the level of full employment.
11. The money wage rate is constant.
12. There is stable consumption function.
13. The rate of interest is fixed.
14. The analysis relates to the short period.

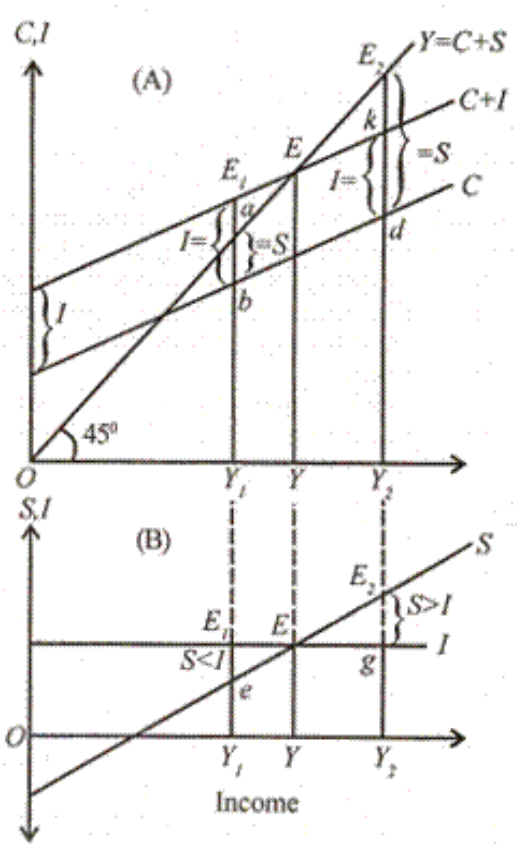
Given these assumptions, the equilibrium level of national income can be determined by the equality of aggregate demand and aggregate supply or by the equality of saving and investment. Aggregate demand is the summation of consumption expenditure on newly produced consumer goods by households and on their services (C), and investment expenditure on newly produced capital goods and inventories by businessmen (I).

It is shown by the following identities:

$Y = C + I$ …. (1)
Personal Income: $Y_d = C+S$…. (2)
But $Y = Y_d$
$C + I = C + S$
Or $I = S$
Where, Y = national income, Y_d = disposable income (as no tax), C = consumption, S = saving and I = investment.

In the above identities, C + l relate to consumption and investment expenditures which represent aggregate demand of an economy. C is the consumption function which indicates the relation between income and consumption expenditure.

Figure 12



The consumption function is shown by the slope of the C curve in figure 12, which is MPC (marginal propensity to consume). I is investment demand which is autonomous. When investment demands (I) is added to consumption function (C), the aggregate demand function becomes C+I.

C+S identity is related to the aggregate supply of an economy. That is why, consumer goods and services are produced from total consumption expenditure and aggregate savings are invested in the production of capital goods.

In an economy, the equilibrium level of national income is determined by the equality of aggregate demand and aggregate supply (C+I=C+S) or by the equality of saving and investment (S=I). We explain these two approaches one by one with the help of Figure 12(A) and 12(B).

4.3.1.1 Equality of Aggregate Demand and Aggregate Supply

The equilibrium level of national income is determined at a point where the aggregate demand function (curve) intersects the aggregate supply function. The aggregate demand

function is represented by C+I in the figure. It is drawn by adding to the consumption function C the investment demand I.

The 45° line represents the aggregate supply function, Y = C + S. The aggregate demand function C+I intersects the aggregate supply function Y= C + S at point E in Panel (A) of Figure 1 and the equilibrium level of income OY is determined.

Suppose there is disequilibrium in aggregate supply and aggregate demand of the economy. Disequilibrium can be in either case, aggregate supply exceeding aggregate demand or aggregate demand exceeding aggregate supply. How will the equilibrium level of income be restored in the two situations?

First, take the case when aggregate supply exceeds aggregate demand. This is shown by OY_2 level of income in Panel (A) of the figure. Here aggregate output or supply is Y_2E_2 and aggregate demand is Y_2k. The disposable income is OY_2 (= Y_2E_2). At this income level OY_2, consumers will spend Y_2d on consumption goods and save dE_2.

But businessmen intend to make investment equal to dk in order to buy investment goods. Thus the aggregate demand for consumption goods and investment goods is $Y_2d + dk = Y_2k$. But aggregate supply (or output) Y_2E_2 is greater than aggregate demand Y_2k by kE_2 (=$Y_2E_2 – Y_2k$).

Therefore, the surplus output of goods worth kE_2 accumulated by businessmen in the form of unintended inventories. In order to avoid further inventory accumulation, they will reduce production. As a result of the reduction in output, income and employment will fall and the equilibrium level of income will be restored at OY where the aggregate supply equals aggregate demand at point E.

The second situation of disequilibrium when aggregate demand exceeds aggregate supply is shown by the income level of OY_1 in Panel (A) of the figure. Here the aggregate demand is Y_1E_1 and the aggregate output is Y_1a. The disposable income is OY_1 (=Y_1a).

At this income level, consumers spend Y_1b on consumption goods and save ba. But businessmen intend to invest bE, to buy investment goods. Thus the aggregate demand is $Y_1b + bE_1 = Y_1E_1$ which is greater than the aggregate supply of goods Y_1a by aE_1.

To meet this excess demand worth aE_1, businessmen will have to reduce inventories by this amount. In order to stop further reduction in their inventories, businessmen will increase production. As a result of the increase in production, output, income and employment will increase in the economy and the equilibrium level of income OY will be restored again at point E.

4.3.1.2 Equality of Saving and Investment

The equilibrium level of income can also be shown by the equality of the saving and investment functions. Since the equilibrium level of income is determined when aggregate supply (C+S) equals aggregate demand (C + I) in the economy, intended (or planned) saving also equals intended (or planned) investment. This can be shown algebraically

$C + S = C + l$

$S = I$

The equilibrium level of income in terms of the equality of saving and investment is shown in Panel (B) of figure, where I is the autonomous investment function and S is the saving function. The saving and investment functions intersect at point E which determines the equilibrium level of income OY.

If there is disequilibrium in the sense of inequality between saving and investment, forces will operate in the economy and the equilibrium position will be restored. Suppose the income level is OY_2 which is above the equilibrium income level OY.

At this income level OY_2, saving exceeds investment by gE_2. It means that people are consuming and spending less. Thus aggregate demand is less than aggregate supply. This will lead to the accumulation of unintended inventories with businessmen. To avoid further accumulation of inventories, businessmen will reduce production. Consequently, output, income and employment will be reduced till the equilibrium level of income OY is reached at point E where S=I.

On the contrary, if the income level is less than the equilibrium level, investment exceeds saving. This is shown by OY_1 level of income when investment Y_1E_1 is greater than saving. The excess of intended investment over intended saving means that aggregate demand is greater than aggregate supply by eE_1.

Since aggregate output (or supply) is less than aggregate demand, businessmen will decrease inventories held by them. To stop further reduction in their inventories, they will increase production. Consequently, output, income and employment will increase in the economy and the equilibrium level of income OK will be again reached at point E.

4.3.2 Three Sector Model

A three-sector model of income determination consists of a two-sector model and the government sector. The government increases aggregate demand by spending on goods and services, and by collecting taxes.

4.3.2.1 Government Expenditure

First, we take government expenditure. To explain it, given all the above assumptions except the government sector in the two-sector model, income determination is as follows:

$Y = C + I + G$

Similarly, by adding government expenditure (G) to the saving and investment equation, when we have

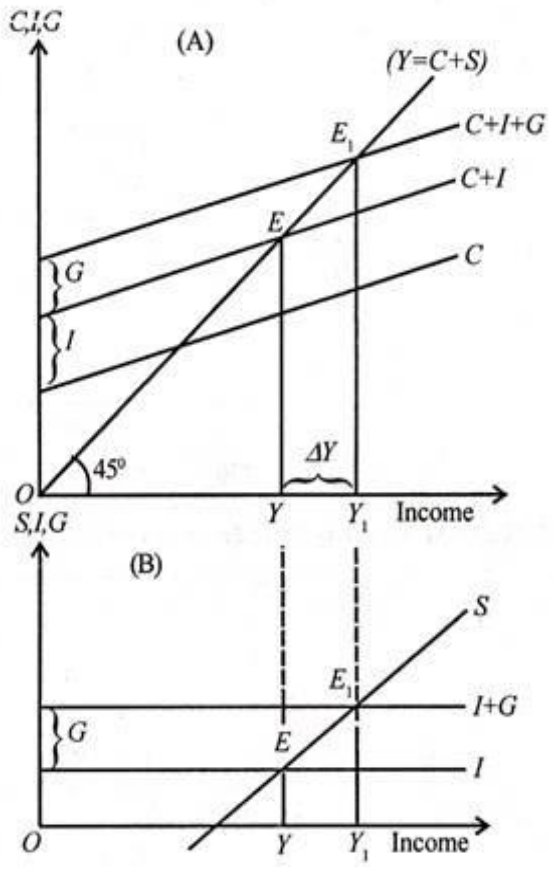
$Y = C + I + G$

$Y = C + S$ [Since, $S = Y-C$]

$I + G = S$

Both are illustrated in Figure 13(A) and 13(B). In Panel (A), C+I+G is the new aggregate demand curve which intersects the aggregate supply curve 45° line at point E_1 where OY_1 is the equilibrium level of income. This income level is more than the income level OY without government expenditure.

Figure 13



Similarly, according to the concept of saving and investment, the new investment curve I+G intersect the saving curve 5 at point in Panel (B). Consequently, the income level OY_1 is determined, which is more than the income level OY without government expenditure.

It should be noted that by adding government expenditure to consumption and investment expenditure (C+ I), the national income increases by YY_1 which is more than the government expenditure, $\Delta Y > G$ in Panel (A) of the figure. This is due to the multiplier effect which depends upon the value of MPC or MPS where MPC or MPS < 1.

4.3.2.2 Equilibrium Income with the Imposition of Tax

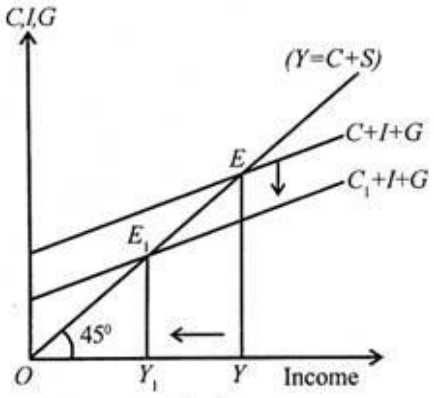
Now we explain the effects of taxes on the level of national income. When the government imposes a tax, the amount of tax is reduced from the national income and what remains is the disposable income. Thus,

$Y - T = Y_d$

Where Y-national income, T = Tax, and Y_d = disposable income. Now disposable income will be less than national income by the amount of tax, $Y_d < Y$. With the fall in disposable income, people will reduce expenditure on consumption. This will lead to reduction in national income, which will depend on the amount or rate of tax and the value of MPC.

Given all the above mentioned assumptions in which government expenditure is constant, the effects of taxes on national income are illustrated in the following figures.

Figure 14

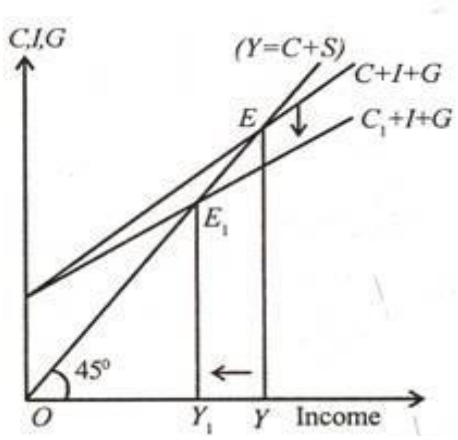


First, the effect of a lump-sum tax on income is shown in figure 14. The equilibrium level of income without a tax is at point E where the aggregate demand curve (C+I+G) intersects the aggregate supply curve 45° line and the income level OY is determined. By imposing a lump-sum tax, the consumption function is reduced by the amount of tax.

As a result, the aggregate demand curve C+I+G shifts downwards to C_1 + I +G and intersects the aggregate supply curve 45° line at point E_1. This result in the reduction of income level from OY to OY_1 Thus with the imposition of a lump-sum tax, the national income is reduced by YY_1.

Now we take a proportional tax which is imposed on income as a constant percentage. With the increase in the rate of tax, consumption and national income will decrease and vice versa. The effect of such a tax on income level is shown in Figure 15.

Figure 15



The aggregate demand curve C+I+G before the imposition of tax intersects the aggregate supply curve 45° line at point E and the income level OY is determined. After imposing the tax, the C+I+G curve shifts downward to C_1+I+G due to a fall in consumption, and it intersects the 45° line at point E_1 consequently, the equilibrium level of national income is reduced by YY_1.

3. Concept of Multiplier

The theory of multiplier occupies an important place in the modern theory of income and employment. The concept of multiplier was first of all developed by F.A. Kahn in the early 1930s. But Keynes later further refined it. F.A. Kahn developed the concept of multiplier with reference to the increase in employment, direct as well as indirect, as a result of initial increase in investment and employment.

Keynes, however, propounded the concept of multiplier with reference to the increase in total income, direct as well as indirect, as a result of original increase in investment and income.

Therefore, whereas Kahn's multiplier is known as 'employment multiplier', Keynes's multiplier is known as investment or income multiplier.

The essence of multiplier is that total increase in income, output or employment is manifold the original increase in investment. For example, if investment equal to Rs. 100 crores is made, then the income will not rise by Rs. 100 crores only but a multiple of it.

If as a result of the investment of Rs. 100 crores, the national income increases by Rs. 300 crores, multiplier is equal to 3. If as a result of investment of Rs. 100 crores, total national income increases by Rs. 400 crores, multiplier is 4. The multiplier is, therefore, the ratio of increment in income to the increment in investment. If ΔI stands for increment in investment and ΔY stands for the resultant increase in income, then multiplier is equal to the ratio of increment in income (ΔY) to the increment in investment (ΔI). Therefore $k = \Delta Y/\Delta I$ where k stands for multiplier.

Derivation of Multiplier

Writing the equation for the equilibrium level of National Income we have:

$$Y = C + I + G \qquad (1)$$

Where, Y = National Income, C = Consumption, I = Investment and G = Govt. Expenditure.

As in the multiplier analysis we are concerned with changes in income induced by changes in investment, rewriting the equation (1) in terms of changes in the variables we have

$$\Delta Y = \Delta C + \Delta I + \Delta G \qquad (1a)$$

In the simple Keynesian model of income determination, change in investment is considered to be autonomous or independent of changes in income while changes in consumption are function of changes in income. In the consumption function,

$$C = a + cY \qquad (2)$$

Where, a is a constant term, c is marginal propensity to consume which is also assumed to remain constant. Therefore, change in consumption can occur only if there is change in income. Thus the theory of Multiplier:

$$\Delta C = c\,\Delta Y \qquad (3)$$

5.1 Autonomous Investment Multiplier

Now by substituting (3) into (1a) with the consideration that $\Delta G=0$ (as government expenditure is autonomous and to see the effect of ΔI we have to consider it) we have,

$\Delta Y = c\Delta Y + \Delta I$

$\Delta Y - c\Delta Y = \Delta I$

$\Delta Y (1 - c) = \Delta I$

$\Delta Y = \Delta I / (1-c)$

$\Delta Y/\Delta I = 1 / (1-c)$

As c stands for marginal propensity to consume, it is clear from above that the size of multiplier depends upon the marginal propensity to consume of the community. The multiplier is the reciprocal of one minus marginal propensity to consume. However, we can express multiplier in a simpler form. As we know that saving is equal to income minus consumption, one minus marginal propensity to consume will be equal to marginal propensity to save, that is, 1 – MPC = MPS. Therefore, multiplier is equal to

$\Delta Y/\Delta I = 1/(1 - MPC) = 1/MPS$

This is the same formula of multiplier as obtained earlier. Note that the value of multiplier $\Delta Y/\Delta I$ will remain constant as long as marginal propensity to consume remains the same.

Keynes' investment multiplier is simple and static in which income depends upon consumption and investment. It is called a two sector model. After Keynes, in order to make the multiplier more practical, economists included a number of variables to construct many multipliers which are called complex multipliers. These are dynamic multiplier, government expenditure multiplier, tax multipliers, balanced budget multiplier and foreign trade multiplier.

Keynes' two sector model depends upon consumption and investment. By including government expenditure and taxes, it becomes a three sector model. When exports and imports are included in it, it becomes a four sector model. These sector models are discussed in the article on Income Determination in a Closed and Open Economy.

The present study explains government expenditure multiplier, tax multiplier and balance budget multiplier.

5.2 Government Expenditure Multiplier

The Keynesian investment multiplier is in fact expenditure multiplier which measures the rate of change in income due to a change in autonomous investment expenditure:

$$K = 1/1\text{-}c$$

Similarly, government expenditure multiplier K_g is a change in income due to a change in autonomous government expenditure. It can be expressed as:

$$\Delta Y = \frac{1}{1-c}\Delta G$$

$$\frac{\Delta Y}{\Delta G} = \frac{1}{1-c}$$

$$Kg = \frac{\Delta Y}{\Delta G} = \frac{1}{1-c}$$

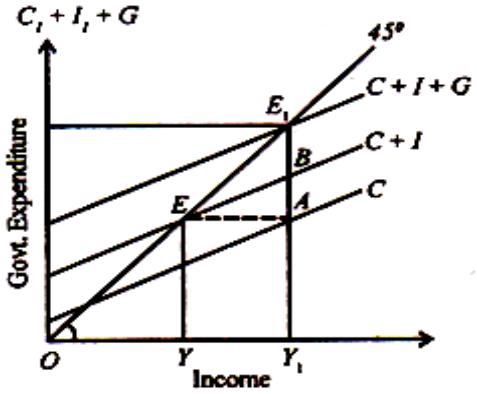
Which shows that change in income (ΔY) is equal to the multiplier (1/1-c) multiplied by change in government autonomous expenditure (ΔG). If c = 2/3, then Kg = 1/1-2/3 = 3.

Which is the value of government expenditure multiplier?

The government expenditure multiplier is shown in figure 16 where income is taken on the horizontal axis and government expenditure (C+I+G) is taken on the vertical axis. According to Keynes' two sector model, (C + I) is the total expenditure curve which cuts the 45° curve at point E and OY is the initial equilibrium income level.

By adding government expenditure (G), the C + l curve shifts upward and becomes C+I+G curve which intersects the 45° line at point E_1. Now OY_1 is the new equilibrium level of income. As a result of the government expenditure multiplier, the increase in income YY_1 (=EA) is more than the government expenditure BE_1. This shows that the government expenditure multiplier is more than unity, as 3 in our above example.

Figure 16



5.3 Tax Multiplier

When the government changes the tax rates, the relation between disposable income and national income will change. When the government increases a tax rate (T) or levies a new tax, the marginal propensity to consume (c) of the people will decline because their disposal income is reduced. This brings a fall in national income due to the multiplier effect. On the other hand, reduction in taxes has the multiplier effect of raising the national income. The tax multiplier (K_T) is:

$$\Delta Y = \frac{-c}{1-c}\Delta T$$

$$K_T = \frac{\Delta Y}{\Delta T} = \frac{-c}{1-c}$$

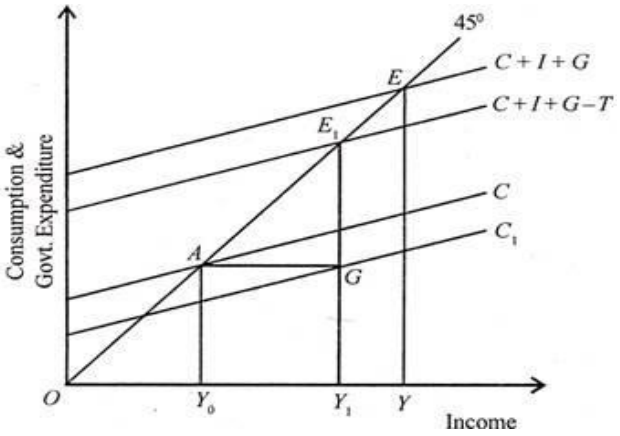
$$\text{If } c = 2/3, \text{ then } K_T = \frac{-2/3}{1-2/3} = -2$$

Government usually levies two types of taxes, lumpsum and proportional.

First, we explain lumpsum tax multiplier in figure 17. Before the levy of a lumpsum tax, C is the consumption function and the income level is OY. Now AG amount of tax is levied. As a result, the disposable income is reduced and the consumption function shifts downward from C to C_1. With the decline in the consumption function, the total expenditure curve (C+I+G) also shifts downward to C+ I + G - T curve. This intersects the 45° line at E_1 and the national income is reduced from OY to OY_1.

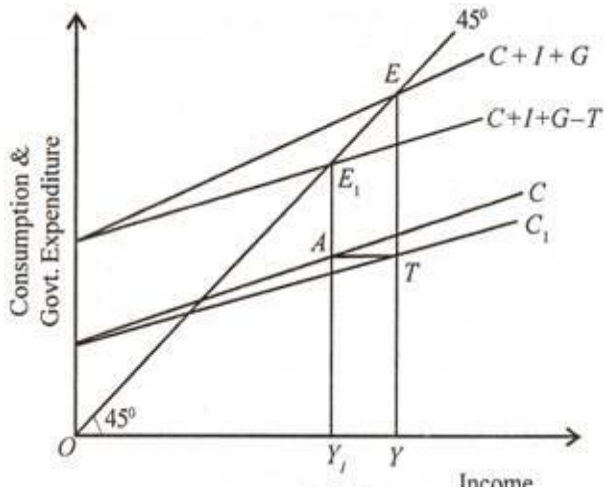
Second, if the government levies a proportional income tax, this also brings a fall in the consumption function due to a decline in disposable income of the people. Consequently, the national income declines due to the tax multiplier.

Figure 17



This is shown is figure 18, where C is the consumption function before the tax is levied and OY is the income level. When AT tax is levied, the C curve revolves downward to C_1. With the fall in the consumption function, the total expenditure curve (C+I+G) also revolves downward to C+I+G-T and intersects the 45° line at E_1. This brings reduction in national income from OY to OY_1.

Figure 18



5.4 Balanced Budget Multiplier

The balanced budget multiplier is used to show an expansionist fiscal policy. In this the increase in taxes (ΔT) and in government expenditure (ΔG) are of an equal amount (ΔT=ΔG). Still there is increase in income. The basis for the expansionary effect of this kind of balanced budget is that a tax merely tends to reduce the level of disposable income.

Therefore, when only a portion of an economy's disposable income is used for consumption purposes, the economy's consumption expenditure will not fall by the full amount of the tax.

On the other hand, government expenditure increases by the full amount of the tax. Thus the government expenditure rises more than the fall in consumption expenditure due to the tax and there is net increase in national income.

The balanced budget multiplier is based on the combined operation of the tax multiplier and the government expenditure multiplier. In the balanced budget multiplier, the tax multiplier is smaller than the government expenditure multiplier. The government expenditure multiplier is:

$$\Delta Y = \frac{1}{1-c}\Delta G$$

$$\text{or } Kg = \frac{\Delta Y}{\Delta G} = \frac{1}{1-c}$$

Which indicates that, the change in income (ΔY) will equal the multiplier (1/1—c) times the change in autonomous government expenditure.

Since the tax multiplier is:

$$\Delta Y = \frac{-c\Delta T}{1-c}$$

$$\text{or } K_T = \frac{\Delta Y}{\Delta T} = \frac{-c}{1-c}$$

Which shows that, the change in income (ΔY) will equal to multiplier (1/1-c) times the product of the marginal propensity to consume (c) and the change in taxes (ΔT).

A simultaneous change in public expenditure and taxes may be expressed as a combination of equations (1) and (2) which is balanced budget multiplier,

$$K_b = \frac{\Delta Y}{\Delta G} + \frac{\Delta Y}{\Delta T} = \frac{1}{1-c} + \frac{-c}{1-c} = \frac{1-c}{1-c} = 1$$

$$\text{or } K_b = 1$$

Since ΔG = ΔT, income will change (ΔY) by an amount equal to the change in government expenditure (ΔG) and taxes (ΔT).

To understand it, it is explained numerically. Suppose the value of c = 2/3 and the increase in government expenditure ΔG = Rs 10 crores. Since ΔG = ΔT, therefore the increase in lumpsum taxes ΔT = Rs 10 crores.

We first calculate the government expenditure multiplier

$$Kg = \frac{\Delta Y}{\Delta G} = \frac{1}{1-c} = \frac{1}{1-2/3} = 3$$

$$\text{Tax multiplier, } K_T = \frac{\Delta Y}{\Delta T} = \frac{-c}{1-c} = \frac{-2/3}{1-2/3} = -2$$

To arrive at the increase in income as a result of the combined operation of the government expenditure multiplier and the tax multiplier, we write the balanced budget multiplier equation as

$$K_b = \Delta Y = \frac{1}{1-c}\Delta G - \frac{-c}{1-c}\Delta T$$

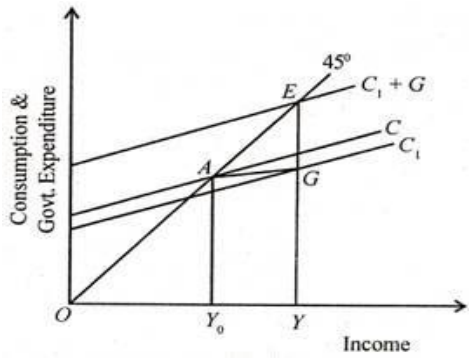
and fit in the above values of c, ΔG and ΔT so that

$$K_b = \Delta Y = 3\Delta G - 2\Delta T$$
$$= 3\times 10 - 2\times 10$$
$$= \text{Rs. 10 crores.}$$

Thus the increase in income (ΔY) exactly equals the increase in government expenditure (ΔG) and the lump-sum tax (ΔT) i.e. Rs. 10 crores. Thus $K_b = 1$.

This balanced budget multiplier or unit multiplier is explained in figure 19. C is the consumption function before the imposition of the tax with income at OY_0 level. Tax of AG amount is imposed. As a result, the consumption function shifts downward to C_1.

Figure 19



Now government expenditure of GE amount is injected into the economy which is equal to the tax yield AG. The new government expenditure line is C_1+ G which determines OY income at point E. The increase in income Y_0 Y equals the tax yield AG and the increase in government expenditure GE.

This proves that income has risen by 1 (one) time the amount of increase in government expenditure which is a balanced budget expansion. This analysis relates to the imposition of a

lump-sum tax. However, when a lump-sum tax is levied, the MPC of national income is reduced, and the value of the multiplier is less than under the lump-sum tax.

The multiplier formula in this case is $\Delta Y/\Delta G = 1/1\text{-}c\ (1\text{-}t)$ the term c (1-t) is the MPC of taxable national income. Thus the fraction of taxable national income spent on consumption will equal c (1-t). In this case, an increase in government expenditure raises the disposable income only by (1-t) times the increase in income because a proportion of the tax levied (t) goes to the government exchequer. Consequently, the MPC of national income is reduced and the value of the multiplier is low, as per the above equation. This can be explained with the help of an example.

Suppose the tax rate (t) = 25%. Thus (1-t) = 1-1/4 and by assuming the value of c (MPC) = 2/3, the government expenditure multiplier with lumpsum tax is

$$\frac{\Delta Y}{\Delta G} = \frac{1}{1-c(1-t)} = \frac{1}{1-2/3(1-1/4)} = \frac{1}{1/2} = 2$$

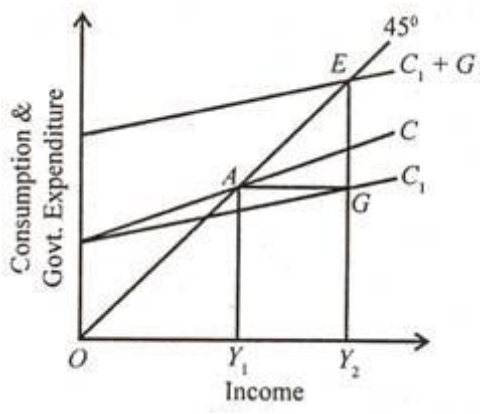
Which is less than the government expenditure multiplier without a tax, i.e.,

$$\frac{\Delta Y}{\Delta G} = \frac{1}{1-c} = \frac{1}{1-2/3} = \frac{1}{1/3} = 3$$

This analysis shows that when a lump-sum income tax is levied the disposable income level is reduced and a portion of the government's increased income due to tax collection goes to the exchequer. Thus the expansionary effect of the government expenditure becomes ineffective and the balanced budget multiplier operates.

But when a proportional income tax is levied, the government expenditure is increased by the full amount of the tax revenue, and nothing goes to the exchequer, the balanced budget theorem holds. This is illustrated in figure 20, where C is the consumption function before the imposition of the income tax.

Figure 20



An income tax equal to Y_1Y_2/OY_2 is levied. As a result, the old consumption function pivots to the lower position of C_1. The tax revenue going to the exchequer is AG. Now government expenditure is equal to the tax revenue.

This is GE = AG which is injected into the economy. The new government expenditure line C_1+G determines OY_2 national income at point E. The increase in income Y_1Y_2 equals the tax revenue AG and the increase in government expenditure GE. Thus the increase in income exactly equals the increase in the tax revenue and the government expenditure.

This proves the balanced budget theorem under proportional income tax. The analysis also shows that even after the imposition of income tax, there is no reduction in the MPC of individuals. It remains unchanged $AY_1 = GY_2$.

But this is highly unrealistic because the tax rate increases and lowers the level of disposable income and the government is not able to match its expenditure equal to the tax yield.

4. Product and Money Market Equilibrium (IS-LM Model)

The Keynes in his analysis of national income explains that national income is determined at the level where aggregate demand (i.e., aggregate expenditure) for consumption and investment goods (C +1) equals aggregate output. In other words, in Keynes' simple model the level of national income is shown to be determined by the goods market equilibrium. In this simple analysis of equilibrium in the goods market Keynes considers investment to be determined by the rate of interest along with the marginal efficiency of capital and is shown to be independent of the level of national income.

The rate of interest, according to Keynes, is determined by money market equilibrium by the demand for and supply of money. In this Keynes' model, changes in rate of interest either due to change in money supply or change in demand for money will affect the determination of national income and output in the goods market through causing changes in the level of investment.

In this way changes in money market equilibrium influence the determination of national income and output in the goods market. However, there is apparently one flaw in the Keynesian analysis which has been pointed out by some economists and has been a subject of a good deal of controversy. It has been asserted that in the Keynesian model whereas the changes in rate of interest in the money market affect investment and therefore the level of income and output in the goods market, there is seemingly no inverse influence of changes in goods market i.e., (investment and income) on the money market equilibrium.

It has been shown by J.R. Hicks and others that with greater insights into the Keynesian theory one finds that the changes in income caused by changes in investment or propensity to consume in the goods market also influence the determination of interest in the money market. According to him, the level of income which depends on the investment and consumption demand determines the transactions demand for money which affects the rate of interest. Hicks, Hansen, Lerner and Johnson have put forward a complete and integrated model based on the Keynesian framework wherein the variables such as investment, national income, rate of interest, demand for and supply of money are interrelated and mutually interdependent and can be represented by the two curves called the IS and LM curves.

This extended Keynesian model is therefore known as IS-LM curve model. In this model they have shown how the level of national income and rate of interest are jointly determined by the simultaneous equilibrium in the two interdependent goods and money markets. Now,

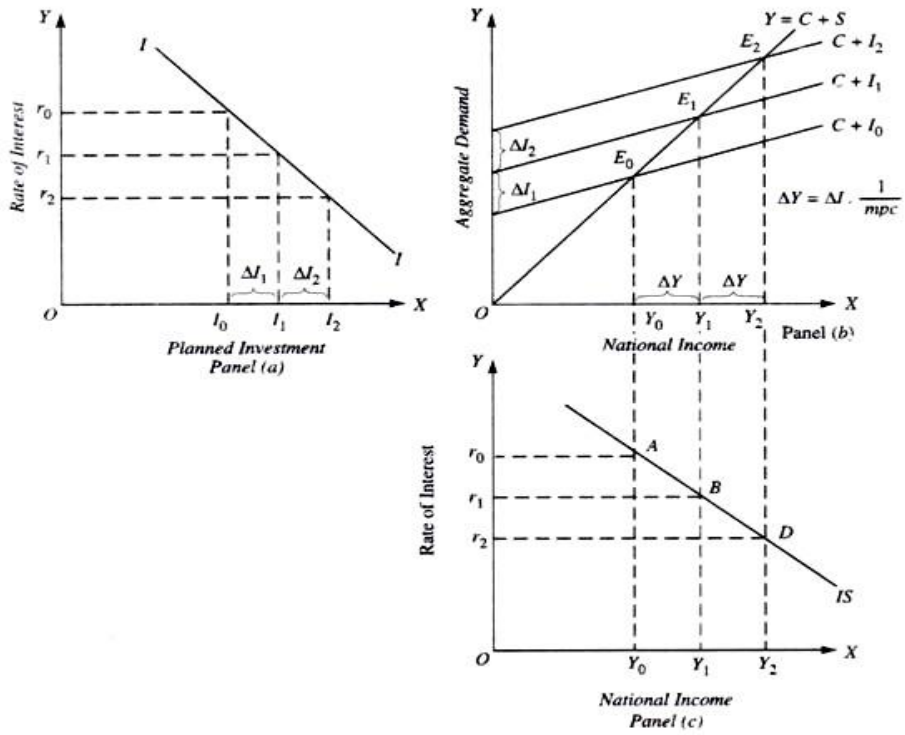
this IS-LM curve model has become a standard tool of macroeconomics and the effects of monetary and fiscal policies are discussed using this IS and LM curves model.

6.1 Product Market Equilibrium: the Derivation of the IS Curve

The IS-LM curve model emphasises the interaction between the goods and money markets. The goods market is in equilibrium when aggregate demand is equal to income. The aggregate demand is determined by consumption demand and investment demand.

In the Keynesian model of goods market equilibrium we also now introduce the rate of interest as an important determinant of investment. With this introduction of interest as a determinant of investment, the latter now becomes an endogenous variable in the model.

Figure 21



When the rate of interest falls, then the level of investment increases and vice versa. Thus, changes in the rate of interest affect aggregate demand or aggregate expenditure by causing changes in the investment demand. When the rate of interest falls, it lowers the cost c' investment projects and thereby raises the profitability of investment.

The businessmen will therefore undertake greater investment at a lower rate of interest. The increase in investment demand will bring about increase in aggregate demand which in turn will raise the equilibrium level of income. In the derivation of the IS Curve we seek to find out the equilibrium level of national income as determined by the equilibrium in goods market by a level of investment determined by a given rate of interest.

Thus IS curve relates different equilibrium levels of national income with various rates of interest. As explained above, with a fall in the rate of interest, the planned investment will increase which will cause an upward shift in aggregate demand function (C + 7) resulting in goods market equilibrium at a higher level of national income.

The lower the rate of interest, the higher will be the equilibrium level of national income. Thus, the IS curve is the locus of those combinations of rate of interest and the level of national income at which goods market is in equilibrium.

How the IS curve is derived is illustrated in figure. In panel (a) of figure 21 the relationship between rate of interest and planned investment is depicted by the investment demand curve II. It will be seen from panel (a) that at rate of interest Or_0 the planned investment is equal to OI_0. With OI_0 as the amount of planned investment, the aggregate demand curve is C + I_0 which, as will be seen in panel (b) of figure 21 equals aggregate output at OY_1 level of national income.

Therefore, in the panel (c) at the bottom of the figure 21, against rate of interest Or_2, level of income equal to OY_0 has been plotted. Now, if the rate of interest falls to Or_2, the planned investment by businessmen increases from OI_0 to OI_1 [see panel (a)]. With this increase in planned investment, the aggregate demand curve shifts upward to the new position C + 11 in panel (b), and the goods market is in equilibrium at OY_1 level of national income. Thus, in panel (c) at the bottom of figure 21 the level of national income OY_1 is plotted against the rate of interest, Or_1.

With further lowering of the rate of interest to Or_2, the planned investment increases to OI_2 (see panel a). With this further rise in planned investment the aggregate demand curve in panel (b) shifts upward to the new position C + I_2 corresponding to which goods market is in equilibrium at OY_2 level of income. Therefore, in panel (c) the equilibrium income OY_2 is shown against the interest rate Or_2.

By joining points A, B, D representing various interest-income combinations at which goods market is in equilibrium we obtain the IS Curve. It will be observed from figure 21 that the IS Curve is downward sloping (i.e., has a negative slope) which implies that when rate of interest declines, the equilibrium level of national income increases.

Why does IS Curve Slope Downward?

What accounts for the downward-sloping nature of the IS curve. As seen above, the decline in the rate of interest brings about an increase in the planned investment expenditure. The increase in investment spending causes the aggregate demand curve to shift upward and therefore leads to the increase in the equilibrium level of national income. Thus, a lower rate of interest is associated with a higher level of national income and vice-versa. This makes the IS curve, which relates the level of income with the rate of interest, to slope downward.

Steepness of the IS curve depends on (1) the elasticity of the investment demand curve, and (2) the size of the multiplier. The elasticity of investment demand signifies the degree of responsiveness of investment spending to the changes in the rate of interest.

Suppose the investment demand is highly elastic or responsive to the changes in the rate of interest, then a given fall in the rate of interest will cause a large increase in investment demand which in turn will produce a large upward shift in the aggregate demand curve. A large upward shift in the aggregate demand curve will bring about a large expansion in the level of national income. Thus when investment demand is more elastic to the changes in the rate of interest, the investment demand curve will be relatively flat (or less steep). Similarly, when investment demand is not very sensitive or elastic to the changes in the rate of interest, the IS curve will be relatively more steep.

The steepness of the IS curve also depends on the magnitude of the multiplier. The value of multiplier depends on the marginal propensity to consume (mpc). It may be noted that the higher the marginal propensity to consume, the aggregate demand curve (C + I) will be more steep and the magnitude of multiplier will be large. In case of a higher marginal propensity to consume (mpc) and therefore a higher value of multiplier, a given increment in investment demand caused by a given fall in the rate of interest will help to bring about a greater increase in equilibrium level of income.

Thus, the higher the value of multiplier, the greater will be the rise in equilibrium income produced by a given fall in the rate of interest and this makes the IS curve flatter. On the other hand, the smaller the value of multiplier due to lower marginal propensity to consume, the smaller will be the increase in equilibrium level of income following a given increment in investment caused by a given fall in the rate of interest. Thus, in case of smaller size of multiplier the IS curve will be more steep.

Shift in IS Curve

It is important to understand what determines the position of the IS curve and what causes shifts in it. It is the level of autonomous expenditure which determines the position of the IS curve and changes in the autonomous expenditure cause a shift in it. By autonomous expenditure we mean the expenditure, be it investment expenditure, the Government spending or consumption expenditure which does not depend on the level of income and the rate of interest.

The government expenditure is an important type of autonomous expenditure. Note that the Government expenditure which is determined by several factors as well as by the policies of the Government does not depend on the level of income and the rate of interest. Similarly, some consumption expenditure has to be made if individuals have to survive even by borrowing from others or by spending their savings made in the past year. Such consumption expenditure is a sort of autonomous expenditure and changes in it do not depend on the changes in income and rate of interest. Further, autonomous changes in investment can also occur.

In the goods market equilibrium of the simple Keynesian model the investment expenditure is treated as autonomous or independent of the level of income and therefore does not vary as the level of income increases. However, in the complete Keynesian model, the investment spending is thought to be determined by the rate of interest along with marginal efficiency of investment. Following this complete Keynesian model, in the derivation of the IS curve we consider the level of investment and changes in it as determined by the rate of interest along with marginal efficiency of capital. However, there can be changes in investment spending autonomous or independent of the changes in rate of interest and the level of income.

For instance, growing population requires more investment in house construction, school buildings, roads, etc., which does not depend on changes in level of income or rate of interest.

Further, autonomous changes in investment spending can also take place when new innovations come about, that is, when there is progress in technology and new machines, equipment, tools etc., have to be built embodying the new technology.

Besides, Government expenditure is also of autonomous type as it does not depend on income and rate of interest in the economy. As is well- known government increases its expenditure for the purpose of promoting social welfare and accelerating economic growth. Increase in Government expenditure will cause a rightward shift in the IS curve.

6.2 Money Market Equilibrium: Derivation of LM Curve

The LM curve can be derived from the Keynesian theory from its analysis of money market equilibrium. According to Keynes, demand for money to hold depends upon transactions motive and speculative motive.

It is the money held for transactions motive which is a function of income. The greater the level of income, the greater the amount of money held for transactions motive and therefore higher the level of money demand curve.

The demand for money depends on the level of income because they have to finance their expenditure, that is, their transactions of buying goods and services. The demand for money also depends on the rate of interest which is the cost of holding money. This is because by holding money rather than lending it and buying other financial assets, one has to forgo interest.

Thus demand for money (m^d) can be expressed as: $m^d = m^d (y, r)$

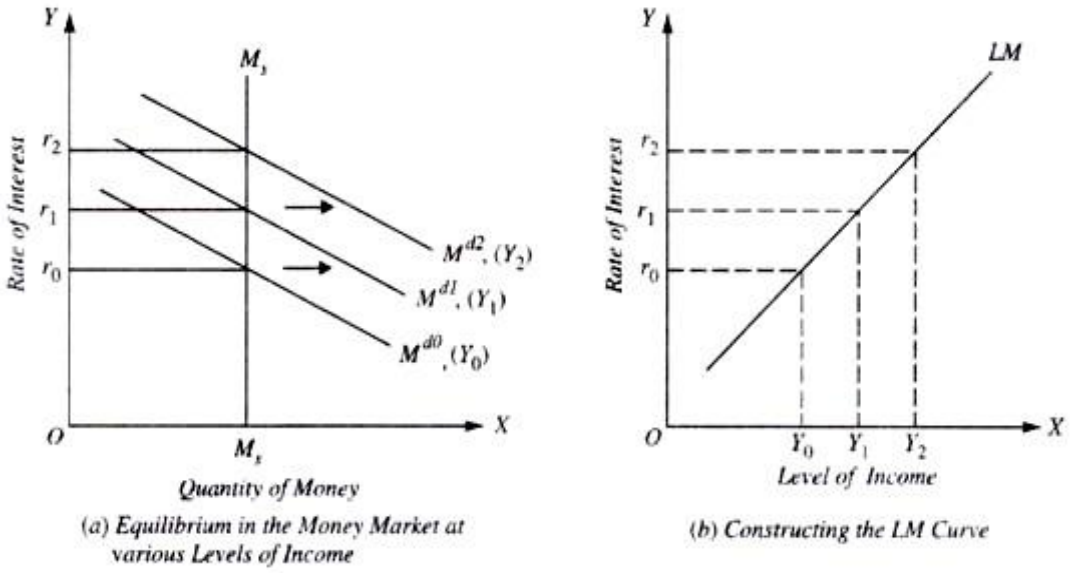
Where, m^d stands for demand for money, y for real income and r for rate of interest. Thus, we can draw a family of money demand curves at various levels of income. Now, the intersection of these various money demand curves corresponding to different income levels with the supply curve of money fixed by the monetary authority would gives us the LM curve.

The LM curve relates the level of income with the rate of interest which is determined by money-market equilibrium corresponding to different levels of demand for money. The LM

curve tells what the various rates of interest will be (given the quantity of money and the family of demand curves for money) at different levels of income.

But the money demand curve or what Keynes calls the liquidity preference curve alone cannot tell us what exactly the rate of interest will be. In figure 22(a) and (b) we have derived the LM curve from a family of demand curves for money.

Figure 22



As income increases, money demand curve shifts outward and therefore the rate of interest which equates supply of money, with demand for money rises. In figure 22(b) we measure income on the X-axis and plot the income level corresponding to the various interest rates determined at those income levels through money market equilibrium by the equality of demand for and the supply of money in figure 22(a).

Slope of LM Curve

It will be noticed from figure 22(b) that the LM curve slopes upward to the right. This is because with higher levels of income, demand curve for money (m^d) is higher and consequently the money- market equilibrium, that is, the equality of the given money supply with money demand curve occurs at a higher rate of interest. This implies that rate of interest varies directly with income.

It is important to know the factors on which the slope of the LM curve depends. There are two factors on which the slope of the LM curve depends. First, the responsiveness of demand

for money (i.e., liquidity preference) to the changes in income, as the income increases, say from Y_0 to Y_1 the demand curve for money shifts from Md_0 to Md_1 that is, with an increase in income, demand for money would increase for being held for transactions motive, m^d.

This extra demand for money would disturb the money market equilibrium and for the equilibrium to be restored the rate of interest will rise to the level where the given money supply curve intersects the new demand curve corresponding to the higher income level. It is worth noting that in the new equilibrium position, with the given stock of money supply, money held under the transactions motive will increase whereas the money held for speculative motive will decline.

The greater the extent to which demand for money for transactions motive increases with the increase in income, the greater the decline in the supply of money available for speculative motive and, given the demand for money for speculative motive, the higher the rise in tie rate of interest and consequently the steeper the LM curve.

The second factor which determines the slope of the LM curve is the elasticity or responsiveness of demand for money (i.e., liquidity preference for speculative motive) to the changes in rate of interest. The lower the elasticity of liquidity preference for speculative motive with respect to the changes in the rate of interest, the steeper will be the LM curve. On the other hand, if the elasticity of liquidity preference (money demand-function) to the changes in the rate of interest is high, the LM curve will be flatter or less steep.

Shifts in the LM Curve

Another important thing to know about the IS-LM curve model is that what brings about shifts in the LM curve or, in other words, what determines the position of the LM curve. As seen above, a LM curve is drawn by keeping the stock or money supply fixed.

Therefore, when the money supply increases, given the money demand function, it will lower the rate of interest at the given level of income. This is because with income fixed, the rate of interest must fall so that demands for money for speculative and transactions motive rises to become equal to the greater money supply. This will cause the LM curve to shift outward to the right.

The other factor which causes a shift in the LM curve is the change in liquidity preference (money demand function) for a given level of income. If the liquidity preference function for

a given level of income shifts upward, this, given the stock of money, will lead to the rise in the rate of interest for a given level of income. This will bring about a shift in the LM curve to the left.

It therefore follows from above that increase in the money demand function causes the LM curve to shift to the left. Similarly, on the contrary, if the money demand function for a given level of income declines, it will lower the rate of interest for a given level of income and will therefore shift the LM curve to the right.

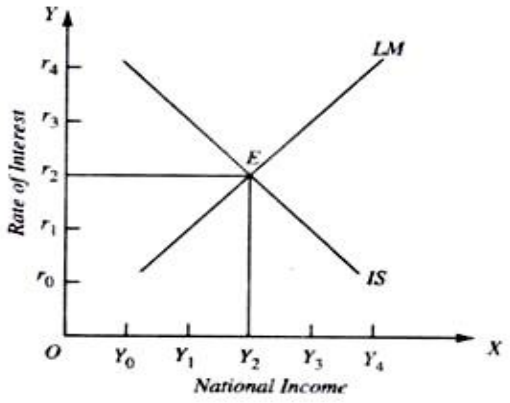
6.3 Product and Money Market Equilibrium

Simultaneous Equilibrium of the Goods Market and Money Market, the IS and the LM curves relate the two variables:

(a) Income and

(b) The rate of interest.

Figure 23



Income and the rate of interest are therefore determined together at the point of intersection of these two curves, i.e., E in figure 23. The equilibrium rate of interest thus determined is Or_2 and the level of income determined is OY_2. At this point income and the rate of interest stand in relation to each other such that (1) the goods market is in equilibrium, that is, the aggregate demand equals the level of aggregate output, and (2) the demand for money is in equilibrium with the supply of money (i.e., the desired amount of money is equal to the actual supply of money). It should be noted that LM cur/e has been drawn by keeping the supply of money fixed.

Thus, the IS-LM curve model is based on:

(1) The investment-demand function,

(2) The consumption function,

(3) The money demand function, and

(4) The quantity of money.

We see, therefore, that according to the IS-LM curve model both the real factors, namely, saving and investment, productivity of capital and propensity to consume and save, and the monetary factors, that is, the demand for money (liquidity preference) and supply of money play a part in the joint determination of the rate of interest and the level of income. Any change in these factors will cause a shift in IS or LM curve and will therefore change the equilibrium levels of the rate of interest and income.

The IS-LM curve model explained above has succeeded in integrating the theory of money with the theory of income determination. And by doing so, as we shall see below, it has succeeded in synthesising the monetary and fiscal policies. Further, with the IS-LM curve analysis, we are better able to explain the effect of changes in certain important economic variables such as desire to save, the supply of money, investment, demand for money on the rate of interest and level of income.

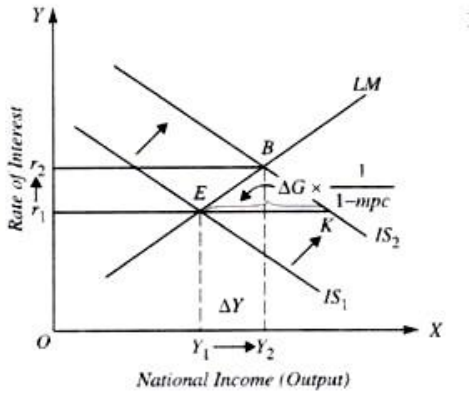
6.4 Explaining Role of Fiscal and Monetary Policies

With the help of IS-LM curve model we can explain how the intervention by the Government with proper fiscal and monetary policies can influence the level of economic activity, that is, income and employment level. We explain below the impact of changes in fiscal and monetary policy on the economy in the IS-LM model.

Effect of Fiscal Policy

Let us first explain how IS-LM model shows the effect of increase in Government expenditure on level of income. This is illustrated in Fig. 24.6. As explained above, increase in Government expenditure which is of autonomous nature raises aggregate demand for goods and services and thereby causes an outward shift in IS curve, as is shown in Fig. 24.6 where increase in Government expenditure leads to the shift in IS curve from $IS_1$to IS_2Note that the horizontal distance between the two IS curves is equal to ΔG x 1/1 –MPC which shows the increase in income that occurs in Keynes's multiplier model.

Figure 24



It will be seen from figure 24 that with the LM curve remaining unchanged, the new IS_2curve intersects LM curve at point B. Thus, in IS-LM model with the increase in Government expenditure (AG), the equilibrium moves from point E to B and with this the rate of interest rises from r_1 to r_2 and income level from Y_1 to Y_2. Thus, IS-LM model shows that expansionary fiscal policy of increase in Government expenditure raises both the level of income and rate of interest.

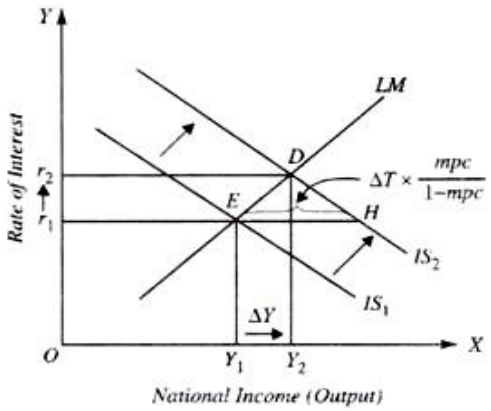
It is worth noting that in the IS-LM model increase in national income by Y_1Y_2 in figure 24 is less than EK which would occur in Keynes's model. This is because Keynes in his simple multiplier model (popularly called Keynesian cross model) assumes that investment is fixed and autonomous, whereas IS-LM model takes into account the fall in private investment due to the rise in interest rate that takes place with the increase in Government expenditure. That is, increase in Government expenditure crowds out some private investment. Likewise, it can be illustrated that the reduction in Government expenditure will cause a right- ward shift in the IS curve, and given the LM curve unchanged, will lead to the fall in both rate of interest and level of income. It should be noted that Government often cuts expenditure to control inflation in the economy.

Reduction in Taxes

An alternative measure of expansionary fiscal policy which may be adopted is the reduction in taxes which through increase in disposable income of the people raises consumption demand of the people. As a result, cut in taxes causes a shift in the IS curve to the right as is shown in figure 25, from IS_1 to IS_2. It may however noted that in the Keynesian multiplier

model, the horizontal shift in the IS curve is determined by the value of tax multiplier which is equal to ΔT x MPC/1 – MPC and causes level of income to increase by EH.

Figure 25



However, in the IS-LM model, with the shift of the IS curve from IS_1 to IS_2 following the reduction in taxes, the economy moves from equilibrium point E to D and as is evident from figure 25, rate of interest rises from r_1 to r_2 and level of income increases from Y_1 to Y_2.

On the other hand, if the Government intervenes in the economy to reduce inflationary pressures, it will raise the rates of personal taxes to reduce disposable income of the people. Rise in personal taxes will lead to the decrease in aggregate demand. Decrease in aggregate demand will help in controlling inflation. This case can also be shown by IS-LM curve model.

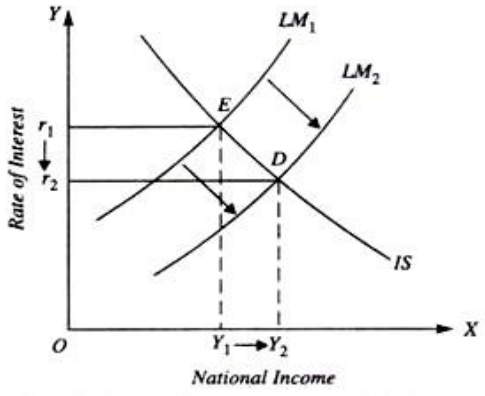
Impact of Monetary Policy

Through making appropriate changes in monetary policy the Government can influence the level of economic activity. Monetary policy may also be expansionary or contractionary depending on the prevailing economic situation. IS-LM model can be used to show the effect of expansionary and tight monetary policies. As has been explained above, a change in money supply causes a shift in the LM curve; expansion in money supply shifts it to the right and decrease in money supply shifts it to the left.

Suppose the economy is in grip of recession, the Government (through its Central Bank) adopts the expansionary monetary policy to lift the economy out of recession. Thus, it takes measures to increase the money supply in the economy. The increase in money supply, state of liquidity preference or demand for money remaining unchanged, will lead to the fall in rate

of interest. At a lower interest there will be more investment by businessmen. More investment will cause aggregate demand and income to rise. This implies that with expansion in money supply LM curve will shift to the right as is shown in figure 26.

Figure 26



As a result, the economy will move from equilibrium point E to D and with this the rate of interest will fall from r_1 to r_2 and national income will increase from Y_1 to Y_2.Thus, IS-LM model shows the expansion in money supply lowers interest rate and raises income.

We have also indicated what is called monetary transmission mechanism, that is, how IS-LM curve model shows the expansion in money supply leads to the increase in aggregate demand for goods and services. We have thus seen that increase in money supply lowers the rate of interest which then stimulates more investment demand. Investment demand through multiplier process leads to a greater increase in aggregate demand and national income. If the economy suffers from inflation, the Government will like to check it. Then its Central Bank should adopt tight or contractionary monetary policy. That is, it should reduce the money supply. IS-LM model can be used to show, as we have seen above in case of expansionary monetary policy, that reduction in money supply will cause a leftward shift in LM curve and will lead to the rise in interest rate and fall in the level of income.

7. Introduction to Foreign Trade: Export and Import Multipliers

The foreign trade multiplier, also known as the export multiplier, operates like the investment multiplier of Keynes. It may be defined as the amount by which the national income of a country will be raised by a unit increase in domestic investment on exports. As exports increase, there is an increase in the income of all persons associated with export industries. These, in turn, create demand for goods. But this is dependent upon their marginal propensity to save (MPS) and the marginal propensity to import (MPM). The smaller these two marginal propensities are, the larger will be the value of the multiplier, and vice versa.

The foreign trade multiplier process can be explained like this. Suppose the exports of the country increase. To begin with, the exporters will sell their products to foreign countries and receive more income. In order to meet the foreign demand, they will engage more factors of production to produce more. This will raise the income of the owners of factors of production. This process will continue and the national income increases by the value of the multiplier. The value of the multiplier depends on the value of MPS and MPM, there being an inverse relation between the two propensities and the export multiplier.

The foreign trade multiplier can be derived algebraically as follows:
The national income identity in an open economy is

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

Where Y is national income, C is national consumption, I is total investment, G is government expenditure, X is exports and M is imports. For simplification we exclude G as it is autonomous.

The above relationship can be solved as:

$$Y-C = 1 + X-M$$

or $S = I+X-M$ $(S=Y-C)$

$$S + M = I + X$$

Thus at equilibrium levels of income the sum of savings and imports (S+M) must equal the sum of investment and export (1+X).

In an open economy the investment component (I) is divided into domestic investment (I_d) and foreign investment (I_f)

I=S

$I_d + I_f = S$… (1)

Foreign investment (I_f) is the difference between exports and imports of goods and services

I_f =X-M…. (2)

Substituting (2) into (1), we have

l_d+ X-M – S

or $I_d + X = S+M$

Which is the equilibrium condition of national income in an open economy. The foreign trade multiplier coefficient (K_f) is equal to

$K_f = \Delta Y/\Delta X$

And $\Delta X = \Delta S + \Delta M$

Dividing both sides by ΔY, we get

$$\frac{\Delta X}{\Delta Y} = \frac{\Delta S + \Delta M}{\Delta Y}$$

or $$\frac{\Delta Y}{\Delta X} = \frac{\Delta Y}{\Delta S + \Delta M}$$

or $$K_f = \frac{\Delta Y}{\Delta S + \Delta M} \qquad \left(\because K_f = \frac{\Delta Y}{\Delta X}\right)$$

$$K_f = \frac{1}{\frac{\Delta S}{\Delta Y} + \frac{\Delta M}{\Delta Y}} \qquad (\because \text{Dividing by } \Delta Y)$$

Hence $$K_f = \frac{1}{MPS + MPM} \qquad \left(\begin{matrix}\because MPS = \Delta S / \Delta Y \\ \because MPM = \Delta M / \Delta Y\end{matrix}\right)$$

Let us understand it with the help of an example.

Suppose MPS=0.3, MPM = 0.2 and ΔX (increase in exports) = Rs. 1000 crores, we get

$$K_f = \frac{\Delta Y}{\Delta X} = \frac{1}{MPS + MPM}$$

or $$\Delta Y = \frac{1}{MPS + MPM} \Delta X$$

$$= \frac{1}{0.3 + 0.2} \times 1000 = \text{Rs. } 2000 \text{ crores}$$

It shows that an increase in exports by Rs. 1000 crores has raised national income through the foreign trade multiplier by Rs. 2000 crores, given the values of MPS and MPM.

The foreign trade multiplier is based on the following assumptions:

1. There is full employment in the domestic economy.

2. There is direct link between domestic and foreign country in exporting and importing goods.

3. The country is small with no foreign repercussion effects.

4. It is on a fixed exchange rate system.

5. The multiplier is based on instantaneous process without time lags.

6. There is no accelerator.

7. There are no tariff barriers and exchange controls.

8. Domestic investment (I_d) remains constant.

9. Government expenditure is constant.

10. The analysis is applicable to only two countries.

Diagrammatic Explanation

Given these assumptions, the equilibrium level in the economy is shown in Figure 1, where S(Y) is the saving function and (S+M) Y is the saving plus import function. l_d represents domestic investment and l_d + X, domestic investment plus exports. (S+M) Y and I_d+ X functions determine the equilibrium level of national income OY at point E, where savings equal domestic investment and exports equal imports.

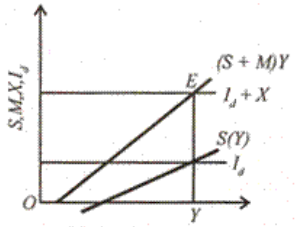


Fig. 1

If there is a shift in the I_d + X function due to an increase in exports, the national income will increase from OY to OY_1 as shown in Figure 2. This increase in income is due to the multiplier effect, i.e. $\Delta Y = K_f \Delta X$. The exports will exceed imports by sd, the amount by which savings will exceed domestic investment. The new equilibrium level of income will be OY_1. It is a case of positive foreign investment.

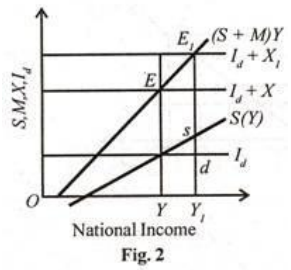


Fig. 2

If there is a fall in exports, the export function will shift downward to $I_d + X_1$ as shown in Figure 3. In this case imports would exceed exports and domestic investment would exceed savings by ds. The level of national income is reduced from OY to OY_1. This is the reverse operation of the foreign trade multiplier.

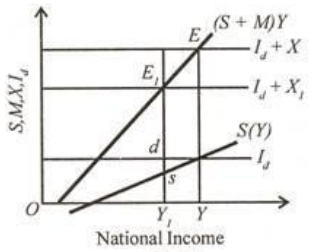


Fig. 3