Macroeconomics in an Open Economy :

ISLM Analysis in an open economy

The IS-LM (Investment Savings-Liquidity preference Money supply) model focuses on the equilibrium of the market for goods and services, and the money market. It basically shows the relationship between real output and interest rates.

It was developed by John R. Hicks, based on J. M. Keynes' "General Theory", in which he analysed four markets: goods, labour, credit and money. This model, firstly named IS-LL, appeared in his article "Mr. Keynes and the Classics: a Suggested Interpretation", published in 1937 in the journal Econometrica.

In order to understand how this model works, we'll first see how the IS curve, which represents the equilibrium in the goods market, is defined. Then, the LM curve, which represents the equilibrium in the money market. Finally, we'll analyse how the equilibrium is reached.

### IS curve: the market for goods and services

In a closed economy, the equilibrium condition in the market for goods is that production (Y), is equal to the demand for goods, which is the sum of consumption, investment and public spending. This relationship is called IS. If we define consumption (C) as $C = C(Y-T)$ where T corresponds to taxes, the equilibrium would be given by:

Y = C (Y– T) + I + G

We consider that investment is not constant, and we see that it depends mainly on two factors: the level of sales and interest rates. If the sales of a firm increase, it will need to invest in new production plants to raise production; it is a positive relation. With regard to interest rates, the higher they are, the more expensive investments are, so that the relationship between interest rates and investment is negative. The new relationship is expressed as follows (where i is the interest rate):

$$Y = C\,(Y- T) + I\,(Y, i) + G$$

If we keep in mind the equivalence between production and demand, which determines the equilibrium in the market for goods, and observe the effect of interest rates, we obtain the IS curve. This curve represents the value of equilibrium for any interest rate.
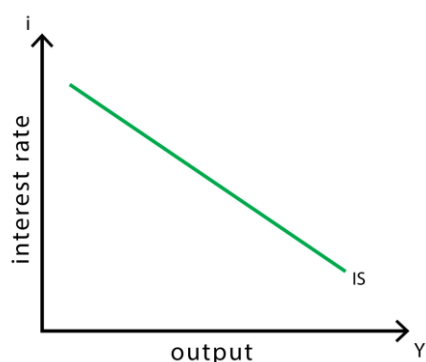

An increasing interest rate will cause a reduction in production through its effect on investment. Therefore, the curve has a negative slope. The adjacent graph shows this relationship.

LM curve: the market for money

The LM curve represents the relationship between liquidity and money. In a closed economy, the interest rate is determined by the equilibrium of supply and demand for money: $M/P=L(i,Y)$ considering M the amount of money offered, Y real income and i real interest rate, being L the demand for money, which is function of i and Y.

The equilibrium of the money market implies that, given the amount of money, the interest rate is an increasing function of the output level. When output increases, the demand for money raises, but, as we have said, the money supply is given. Therefore, the interest rate should rise until the

opposite effects acting on the demand for money are cancelled, people will demand more money because of higher income and less due to rising interest rates.
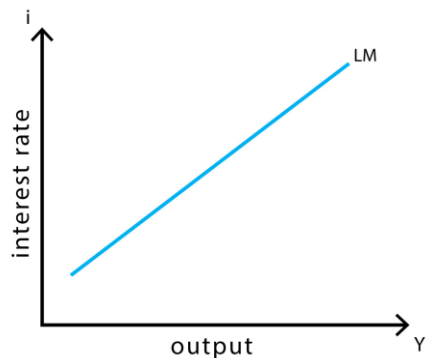
The slope of the curve is positive, contrary to what happened in the IS curve. This is because the slope reflects the positive relationship between output and interest rates.

IS-LM model

At any point of these curves the equilibrium condition in the corresponding market is true, but only at the point where the two curves intersect, both equilibrium conditions are satisfied. We can see this intersection in the following graph:
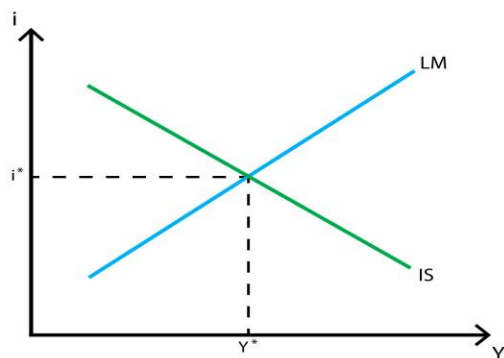
The IS and LM curves undertake changes due to many factors, such as different kinds of economic policies. These variations will explain the changes in the values of production and of interest rates taking place in the economies.

For instance, if there is an increase in government spending, which is considered a fiscal policy, the IS curve will shift to the right, as seen in the graph on the left. This happens because more government spending means more production for any interest rate. This shift, as seen in the adjacent graph, will consequently change the equilibrium from point E1 to point E2, with a greater level of output, but also at greater interest rates.

On the other hand, if we consider a monetary policy, such as an increase in the money supply, the curve that shifts will be the LM curve, as seen in the graph on the right. An increase in the money supply will decrease the interest rate, shifting the LM curve to the right, thus increasing output.

Foreign Exchange Market – Determination of Exchange Rates:

An exchange rate system or regime is a set of international rules governing the setting of exchange rates. A completely flexible or floating rate system is a particularly simple set of rules for the central banks to follow; they do nothing to directly affect the level of their exchange rate. The exchange rate is market determined. To better understand the workings of a flexible exchange rate system, we examine the effect of a shock that increases the demand for foreign exchange. Suppose that the U.S. demand for imported goods increases. For example, assume that an increase in gasoline prices causes a shift from SUVs to small, fuel-efficient foreign cars.

The effect of this increase in import demand would show up in the foreign exchange market as a shift to the right in the demand schedule for foreign

exchange—for example, from D fe 0 to D fe 1 as illustrated in Figure 14-2 . At a

given exchange rate, there is a greater demand.

FIGURE 14-2 Effect in the Foreign Exchange Market of an Increase in the Demand for Imports
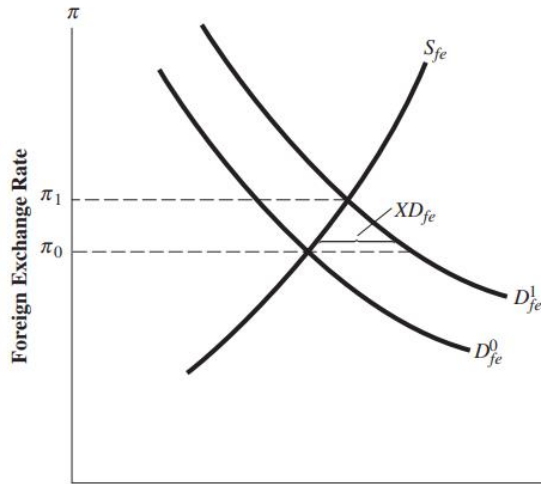
Supply of and Demand for Foreign Exchange

An autonomous increase in import demand shifts the demand schedule for foreign exchange from D_{fe}^0 to D_{fe}^1. At the initial equilibrium exchange rate, there is an excess demand for foreign exchange (XD_{fe}). The exchange rate rises to π_1 to reequilibrate supply and demand in the foreign exchange market.

for imports in the United States and, correspondingly, a greater demand for

foreign exchange. At the initial equilibrium exchange rate 0 , there is now an

excess demand for foreign exchange (shown as XD fe in Figure 14-2). To clear

the market, the exchange rate must rise to the new equilibrium value, 1 . The

rise in the exchange rate will cause the quantity of imports demanded to

decline because the dollar price of imported goods rises with the exchange

rate. Also, the quantity of exports demanded will increase because the rise in

the exchange rate makes U.S. exports less expensive to foreigners. At the new

equilibrium with the higher exchange rate (1), the supply of and demand for foreign exchange are again equal. The increase in import demand leads to a depreciation of the dollar.

EXCHANGE RATE DETERMINATION: FIXED EXCHANGE RATES

An international monetary system is a set of rules organising exchange rate determination and agreeing on which assets will be official reserve assets. An example of a fixed exchange rate system is the post–World War II Bretton Woods system . The international monetary agreements that made up this system were negotiated near the end of the war.The IMF was set up to administer the Bretton Woods system. According to IMF rules, the United States was to set a parity, or par value , for its currency in terms of gold. Other nations would set parities for their currencies in terms of dollars, which with the dollar tied to gold also fixed the gold value of these other currencies. The United States agreed to maintain convertibility between the dollar and gold at the fixed price (originally $35 per ounce). Other countries agreed to maintain convertibility (after a period of postwar adjustment) with the dollar and other currencies but not with gold. The other countries agreed to maintain their exchange rates vis-à-vis the dollar within a 1 percent range on either side of the parity level. The differential responsibility of the United States compared to other IMF members concerning convertibility into gold seemed sensible because, at the time, the United States had approximately two-thirds of the official world gold reserves.

Pegging the Exchange Rate

To see how a system of fixed exchange rates functions, we examine the way a country can "peg," or fix, the level of its exchange rate. To do so we return to our two-country example and assume that the United States wants to fix its exchange rate against the euro, which we are using to represent the currencies of the rest of the world. We ignore the 1 percent margin just mentioned and assume that the U.S. central bank wishes to fix an exact par value for the dollar, say at an exchange rate of 1 euro equals 1 dollar. The working of the foreign exchange market with this fixed exchange rate system is illustrated in Figure 14-3 . We assume that this official fixed exchange rate, 1.0, is below the equilibrium exchange rate in a flexible rate system, the equilibrium rate in Figure 14-3 being 1.25 . At the fixed exchange rate in such a situation, the dollar would be said to be overvalued and the euro undervalued

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FIGURE 14-3   Foreign Exchange Market with a Fixed Exchange Rate

Supply of and Demand for Foreign Exchange
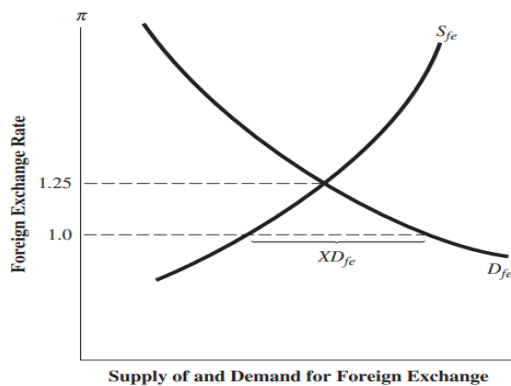
In a fixed exchange rate system, if the official exchange rate ($\pi = 1.0$) is below the market equilibrium rate ($\pi = 1.25$), there will be an excess demand for foreign exchange, XD_{fe}. To keep the exchange rate from rising, domestic or foreign central banks must supply foreign exchange.

because the central bank will be willing to sell euros at that price. In the situation depicted in Figure 14-3 , with the exchange rate below the equilibrium rate, there is an excess demand for foreign exchange (euros), shown as XD fe in the figure. To keep the exchange rate from rising, the U.S. central bank can supply foreign exchange; that is, it can exchange euros for dollars in the foreign exchange market. Alternatively, the European Central Bank might be the one to intervene. This bank would supply euros (sell euros and buy dollars) to satisfy the excess demand for euros and to keep the price of the euro at the official exchange rate.

BALANCE OF PAYMENT

Balance of Payments According to Kindle Berger, "The balance of payments of a country is a systematic record of all economic transactions between the residents of the reporting country and residents of foreign countries during a given period of time".

• It is a double entry system of record of all economic transactions between the residents of the country and the rest of the world carried out in a specific period of time when we say "a country's balance of payments" we are referring to the transactions of its citizens and government.

FEATURES OF BOP

 • It is a systematic record of all economic transactions between one country and the rest of the world.

 • It includes all transactions, visible as well as invisible.

• It relates to a period of time. Generally, it is an annual statement.

• It adopts a double-entry book-keeping system. It has two sides: credit side and the debit side. Receipts are recorded on the credit side and payments on the debit side.

BALANCE OF TRADE

• The difference between a country's imports and its exports.

• Balance of trade is the largest component of a country's balance of payments.

• Debit items include imports, foreign aid, domestic spending abroad and domestic investments abroad.

• Credit items include exports, foreign spending in the domestic economy and foreign investments in the domestic economy.

• When exports are greater than imports than the BOT is favourable and if imports are greater than exports then it is unfavourable

THE VARIOUS COMPONENTS OF A BOP STATEMENT

1. Current Account 2. Capital Account 3. Reserve Account 4. Errors & Omissions

CURRENT ACCOUNT BALANCE

• BOP on a current account is a statement of actual receipts and payments in a short period.

• It includes the value of export and imports of both visible and invisible goods. There can be either surplus or deficit in the current account.

• The current account includes:- export & import of services, interests, profits, dividends and unilateral receipts/payments from/to abroad.

• BOP on current account refers to the inclusion of three balances of namely – Merchandise balance, Services balance and Unilateral Transfer balance

TYPES OF BALANCES

• **Trade Balance Merchandise:** exports - imports of goods

• Services: exports - imports of services Income Balance Net investment income: net income receipts from assets Net international compensation to employees: net compensation of Employees Net Unilateral Transfers Gifts from foreign countries minus gifts to foreign countries

CAPITAL ACCOUNT BALANCE

• The capital account records all international transactions that involve a resident of the country concerned changing either his assets with or his liabilities to a resident of another country. Transactions in the capital account reflect a change in a stock – either assets or liabilities.

• There is a difference between the receipts and payments on account of capital account. It refers to all financial transactions.

• The capital account involves inflows and outflows relating to investments, short term borrowings/lending, and medium term to long term borrowing/lending

CAPITAL ACCOUNT BALANCE

• There can be surplus or deficit in the capital account.

• It includes: - private foreign loan flow, movement in banking capital, official capital transactions, reserves, gold movement etc.

• These are classified into two categories-

1. Direct foreign investments 2. Portfolio investments & Other capital

THE RESERVE ACCOUNT

• Three accounts: IMF, SDR, & Reserve and Monetary Gold are collectively called The Reserve Account.

• The IMF account contains purchases (credits) and repurchase (debits) from the International Monetary Fund.

• Special Drawing Rights (SDRs) are a reserve asset created by IMF and allocated from time to time to member countries. It can be used to settle international payments between monetary authorities of two different countries.

ERRORS & OMISSIONS

• The entries under this head relate mainly to leads and lags in reporting of transactions

• It is of a balancing entry and is needed to offset the overstated or understated components.

DISEQUILIBRIUM IN THE BALANCE OF PAYMENTS

A disequilibrium in the balance of payment means its condition ofSurplus Or deficit.

A Surplus in the BOP occurs when Total Receipts exceeds

Total Payments.

Thus, BOP= CREDIT>DEBIT.

A Deficit in the BOP occurs when Total Payments exceeds Total Receipts. Thus,

BOP= CREDIT<DEBIT

CAUSES OF DISEQUILIBRIUM IN THE BOP

- **Cyclical fluctuations**
- **Short fall in the exports**
- **Economic Development**
- **Rapid increase in population**
- **Structural Changes**
- **Natural Calamities**
- **International Capital Movements**

Currency devaluation and revaluation

Under a fixed exchange rate system, devaluation and revaluation are official

changes in the value of a country's currency relative to other currencies.

Devaluation is when the price of the currency is officially decreased in a fixed

exchange rate system.

Revaluation is when the price of the currency is increased within a fixed exchange rate system.

For example, suppose a government has set 10 units of its currency equal to one rupee. To devalue, it might announce that from now on 20 of its currency units will be equal to one rupee. This would make its currency half as expensive to Indians, and the Indian Rupee twice as expensive in the devaluing country.

To revalue, the government might change the rate from 10 units to one rupee, to five units to one rupee. This would make the currency twice as expensive to Indians, and the rupee half as costly at home.

Effects of devaluation

Cheaper exports: Devaluation makes the country's exports relatively less expensive for foreigners.

Expensive imports: Devaluation makes foreign products relatively more expensive for domestic consumers, thus discouraging imports.

Rise in inflation: For an import dependent country like India, Currency depreciation would mean increase in prices of imports, thus leading to inflation.

Lower investor confidence: Devaluation may dampen investor confidence in the country's economy and hurt the country's ability to secure foreign investment

currency depreciation and appreciation

Under a floating exchange rate system, market forces generate changes in the value of the currency, known as currency depreciation or appreciation.

Currency appreciation

Currency appreciation refers to the increase in value of one currency relative to another in the forex markets.

Reasons of currency appreciation

In a floating rate exchange system, the value of a currency constantly changes based on supply and demand in the forex market. This change allows traders and firms to increase or decrease their holdings and profit over them. Thus, a currency appreciates when the value of one goes up in comparison to the other. Appreciation is directly linked to demand. If the value appreciates (or goes up), demand for the currency also rises.

Effects of currency appreciation

Export costs rise: If the Indian Rupee (INR) appreciates, foreigners will find Indian goods more expensive because they have to spend more for those goods in INR. That means that with the higher price, the number of Indian goods being exported will likely drop. This eventually leads to a reduction in gross domestic product (GDP).

Cheaper imports: If Indian goods become more expensive on the foreign market; foreign goods, or imports, will become cheaper in India. The length to

which 1 INR will stretch will go further, meaning one can buy more goods imported from abroad. That leads to a benefit of lower prices, leading to lower overall inflation.

Currency depreciation

Currency depreciation is a fall in the value of a currency in a floating exchange rate system. Currency depreciation in one country can spread to other countries.

Reasons of currency depreciation

Economic fundamentals: Countries with weak economic fundamentals like burgeoning current account deficits and high rates of inflation can lead to currency depreciation.

Interest rate differentials

Easy monetary policy and high rates of inflation are two of the leading cause of currency depreciation. When interest rates are low, investors, both domestic and foreign, will chase the highest yield. Expected interest rate differentials can also lead to currency depreciation. Central banks will increase interest rates to combat inflation as too much inflation can lead to currency depreciation.

Political instability: In both, unstable policy regimes and unstable governments, investors are suspicious about market forces.

Effects of currency depreciation

Improves export competitiveness: Currency depreciation, if orderly and gradual, improves a nation's export competitiveness and may improve its trade deficit over time.

May lead to pulling of foreign investment: An abrupt and sizable currency depreciation may scare foreign investors who fear the currency may fall further, leading them to pull portfolio investments out of the country

What Is a J-Curve?

A J-curve is a trendline that shows an initial loss immediately followed by a dramatic gain. In a chart, this pattern of activity would follow the shape of a capital "J".

The J-curve effect is often cited in economics to describe, for instance, the way that a country's balance of trade initially worsens following a devaluation of its currency, then quickly recovers and finally surpasses its previous performance.

J-curves are observed in other fields including medicine and political science. In each case, it depicts an initial loss followed by a significant gain to a level that exceeds the starting point.

A Keynesian Approach on BOP

- Although the part played by income changes in BOP adjustment is Keynesian in approach and method, Keynes himself took no direct part in its formulation or development.
- The new approach to income determination theory marked by the appearance of Keynes' General Theory of Employment, Interest and Money in 1956 made possible the formulation of a new approach to adjustment process by Mrs. Joan Robinson, R.F. Harrod, Fritz Machlup and others.
-
- This new approach showed that an imbalance in BOP involved an adjustment in income, employment and output irrespective of what changes took place in prices and of how the deficit was financed. It showed an interaction between the BOP and national income which was a dual one: the "adjustment process", by which a BOP is adjusted by changes in the income levels of the home country and the rest of the world; and the "transmission process", which shows how variations In the national income of one country may through their balances of payments cause variations in the national incomes of other countries.

- Moreover, it enabled certain powerful analytic tools of income analysis, such as national income multiplier, to be applied to the adjustment process. Thus, with the development of income approach lo BOP adjustment, a marriage was effected between the theory of International trade and business cycle theory from which much could be expected. It explains not only the adjustment process but also the transmission process.

- It shows that since deficits are adjustable by relative movements of national income, by reduction of income in the deficit country and increase of income in the surplus country, correction of a deficit must under static productivity conditions, necessarily involve a reduction in national income.

- The full condition of equilibrium for a country had now to be redefined as one in which total external receipts equaled total external payments at full employment.

- This linkage of external equilibrium for a country with its level of Income and employment by the new approach enabled a much clearer and more realistic view to be taken of 150P policy in the post-war period.

Mundell Fleming model

Introduction

In this section we present the Mundell- Fleming Model. It is an open economy version of the IS - LM model. Being similar to the IS-LM model, it focuses on the interaction between the goods market and the money market. Also, like the IS-LM model, it explains the short run fluctuations in the aggregate income and analyses the effects of monetary and fiscal policy on the economy.

The assumptions of this model are:

- The economy under consideration is a small open economy
- There is perfect capital mobility in this small economy, that is, the economy can borrow or lend as much as it wants in the world financial market.
- The economy's interest rates determined by the world interest rate (r^*). It works in the following fashion:
- let there be a rise in the rate of interest (r) in the small economy (due to some event in the economy).

It would then attract foreigners to start lending to this small economy for example:

by buying this country's bonds. This will lead to the capital inflow in the economy, which would continue to occur till the rate of interest, r, reduces; then the capital outflow would occur to earn a higher return abroad. This would continue till r is equal to r* in the world financial market i.e. r = r*. A.3: The price level in this small economy (P) is equal to world's price level (P*). Hence, P = P*. This implies that the real exchange rate is proportional to the nominal exchange rate. As in the IS-LM model, we derive the goods market

and money market equilibrium schedules. The only difference is the addition of the open economy terms in the IS and the LM curves.

We call them IS* and LM* curves and finally we find out the simultaneous equilibrium in the economy.

Let r be the rate of interest in our small open economy and r* be the rate of interest in the world financial markets.

Then, r=r* because of assumption A.1. Derivation of IS* curve The usual IS curve for closed economy is modified into IS* curve for the open economy by adding net exports and r*.

 That is, **IS*: Y = C (Y−T) + I (r*) + G + NX (e) ... (1)**

Equation (1) states that aggregate income is the sum of consumption (C), investment (I), government expenditure (G) and net exports (NX).

The IS* is derived from the net exports schedule and the Keynesian cross. Consider figure 1 and Panel A, which shows the net exports schedule. It is a downward sloping curve which shows the relationship between net exports and the exchange rate in the economy
. Suppose, the exchange rate appreciates, i.e. there is an increase in exchange rate from E1 to E2.

Thus, the foreign goods become cheaper relative to domestic goods. Thus the exports decrease and imports increase which leads to decrease in net exports from NX1 to NX2. This shows that the net exports curve is downward sloping for this economy.

Derivation of the LM* curve The LM* curve for open economy
is derived as follows:
The usual LM curve is given by the equation: $M/P = L(r, y)$ Since $r = r^*$, the LM*
curve becomes:

$M/P = L(r^*, y)$

Diagrammatically, the LM* is derived as follows:

The LM* The curve is derived using the LM curve. Consider figure 2 and Panel A.

It shows the upward sloping, usual LM curve. As $r = r^*$ point E becomes the

relevant point in the LM*. Panel B shows LM* curve which is a straight line

vertical curve measuring exchange rate on the y-axis and income level on

the x-axis. This is so because the exchange rate does not enter into LM*. The

money supply M is an exogenous variable and the price level P is assumed to

be exogenous. Thus, given the world interest rate, r*, and the LM* schedule,
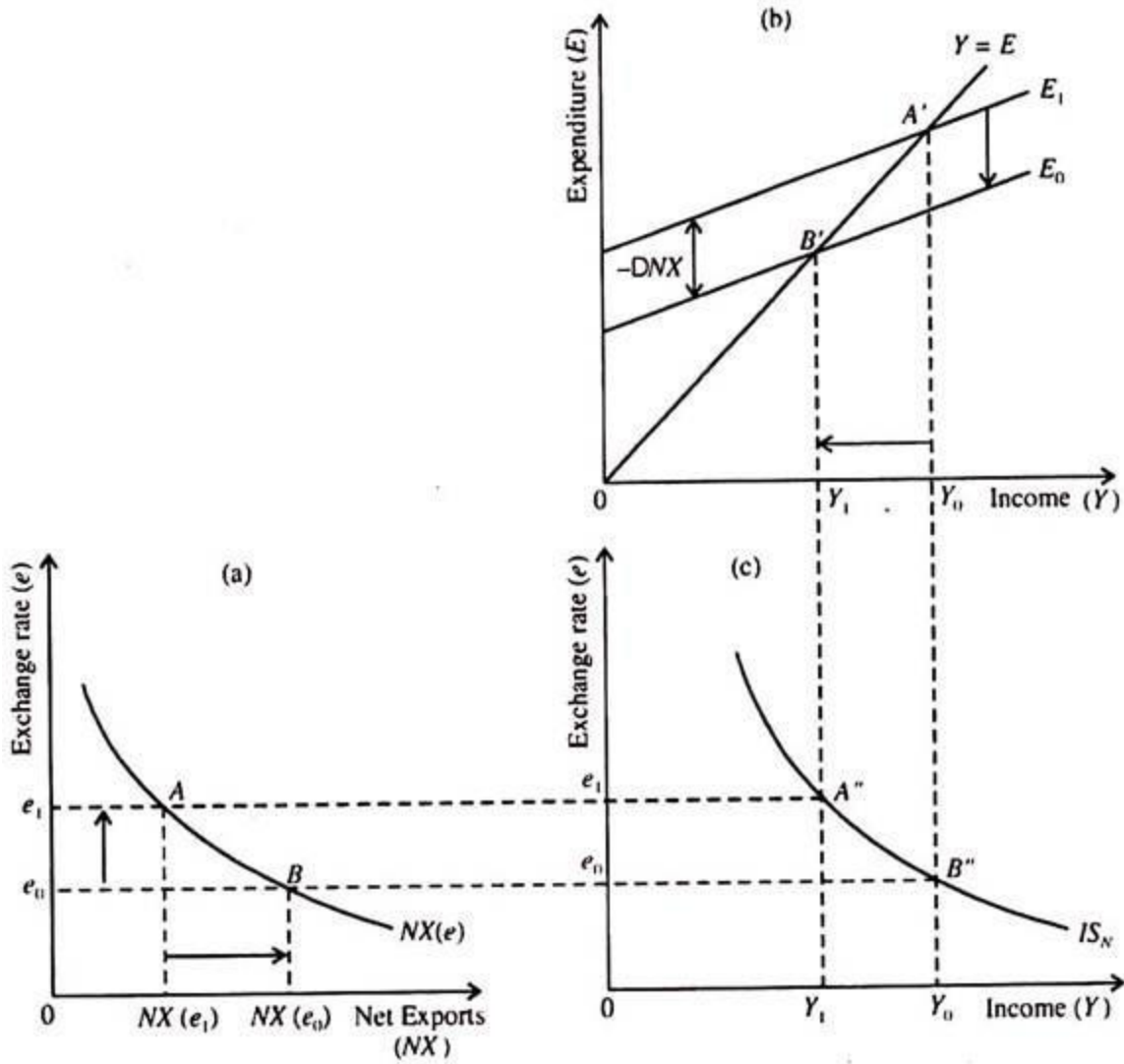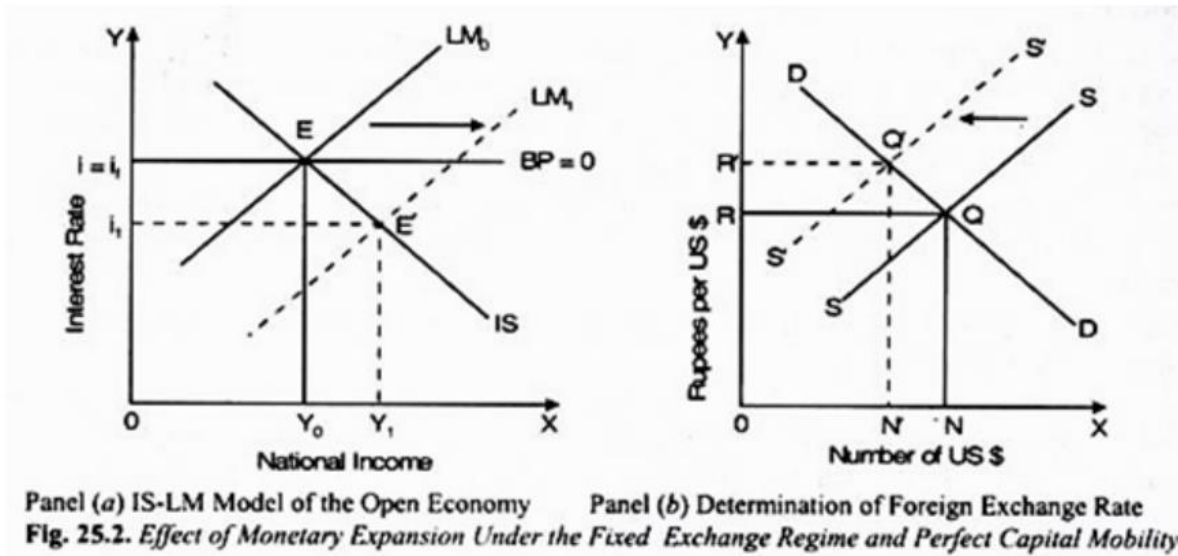
determines the aggregate income.

Fig. 12.1 The New IS Curve

Panel (a) IS-LM Model of the Open Economy   Panel (b) Determination of Foreign Exchange Rate
Fig. 25.2. *Effect of Monetary Expansion Under the Fixed Exchange Regime and Perfect Capital Mobility*

Simultaneous determination of equilibrium Using the above IS* and LM* we have equilibrium for the open economy: We know, IS*: $Y = C(Y-T) + I(r^*) + G + NX(e)$ M*: $M/P = L(r^*, y)$

There are two endogenous variables – Y and e in the model and the policy variables are G,T,M,P and r*. The simultaneous equilibrium occurs at the point of intersection of IS* and LM*. It shows the equilibrium E and Y* at which the goods market and the money market clear. The diagrammatic representation is represented

Effect of Policies This section discusses the effect of the monetary policy and fiscal policy under the fixed exchange rate regime and flexible exchange rate regime. 4.5 Fiscal Policy and Its Impact under Flexible Exchange Rate System

Consider Figure 4, the economy is at equilibrium at point E1. The rate of exchange is e1 and the level of income is Y1. Let there be an expansionary fiscal policy. It leads to a rise in government expenditure or a fall in the taxes. Now, this has stimulative effect on the aggregate demand in the economy and due to which IS* curve will shift to the right i.e. IS*1 and IS*2 as shown by the figure . The new equilibrium occurs at point E2. At this point, the exchange rate increases from e1 to e2. However, the level of income remains at Y1.

Classical versus Keynesian Approach

Keynes termed all economists prior to him as 'classical'. The classical period, generally taken as the period before 1930, was dominated by the work of Adam Smith (Wealth of Nations, 1776), David Ricardo (Principles of Political Economy, 1817) and John Stuart Mill (Principles of Political Economy, 1848). Neoclassical economists such as Alfred Marshall and A. C. Pigou extended the classical ideas. Important features of the classical ideas are as follows

CLASSICAL ECONOMICS APPROACH

Concepts Related to Classical Theory

The main concepts used in the classical model are:

Full Employment: An economy is said to be in full employment when its entire labour force is gainfully employed. Labour force is that part of the population

of the country which is physically and mentally able and at the same time willing to work.

Nominal Wage vs. Real Wage: Nominal wage is what a worker receives in the form of money.

Real wage is what a worker can buy from the nominal wage. Real wage = Nominal wage w = Price level p Real Rate of Interest: Nominal rate of interest is the rate which the lender receives from the borrower in money.

Real rate of interest is rate accruing after adjustment of inflation. (Rate of interest = ROI, ROI in figures)

Real ROI = Nominal ROI – rate of inflation

Value of Marginal Product of Labour (VMPL): VMPL equals MPL multiplied by the price of the product (P) the labour produces.

VMPL = MPL × P = MPL × AR It is distinguished from 'Marginal Revenue Product of Labour (MRPL), which equals MPL ×MR. Since in case of perfect competition in the product market **MR=AR, VMPL=MRPL .**

Aggregate Demand and Aggregate Supply: Aggregate demand is the total value of final goods and services that all sections of the economy taken together are planning to buy at a given level of income during a period of time. Aggregate supply is the value of final goods and services planned to be produced in an economy during a period.

Supply of Money: Money supply of a country is the stock of money on a specific day. This is the sum of currency held outside banks and chequable deposits. This is the money which can be directly used for transactions

Say's Law

Say's law of market states that ' supply creates its own demand'. If goods are produced then there will automatically be a market for them. This means that there cannot be a general 'overproduction' or 'glut' in an economy that is based on a market system of production and exchange.

Correspondingly, there cannot be a deficiency in aggregate demand. Each person's production constitutes his or her demand for other goods; hence, for the entire community, aggregate demand equals aggregate supply

Assumptions of Say's Law

Say's law is based upon the following assumptions:

- The amount of labour and capital can be raised in a free enterprise system based on a price mechanism.
- In an expanding economy new firms and labourers can have easy entry by offering their products in exchange without dislocating the position of existing firms and labourers.
- The size of the market is capable of expansion.
- All savings are automatically invested, i.e., savings always equals investment.
- The Government does not interfere in the functioning of the economy.

Implications of Say's Law

Why is it called a Full Employment ?

- It is called the "full employment model" because the classical economists believed that free market forces of demand and supply lead to full employment of resources through automatic adjustments in overall price level (output market), wage rates (labour market) and interest rate (capital market).

- The entire economy is in full employment equilibrium because all markets are interrelated and what happens in one market will have an impact in other markets.

- The interrelation between Markets The interrelation is depicted through the "circular flow of income" diagram.

Figure 3.1
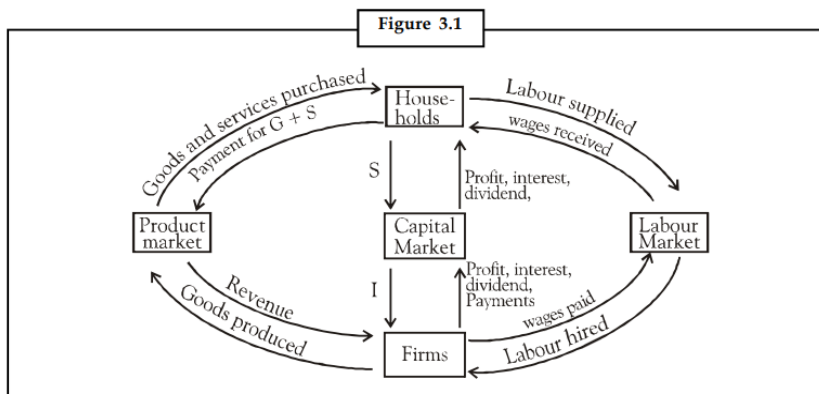
- Assuming a closed economy and no government, households and firms interact in the labour, product and capital markets. Households supply

labour to firms that use that labour to produce goods and services. Firms compensate workers by paying wages. Households use their income to purchase goods and services firms produce. Households also save and their savings finance firms' investments. Households earn interest and dividend in return.

Neutrality of Money (Classical Dichotomy)

When price level rises, nominal GDP rises but the real GDP remains unchanged. In the labour market, nominal wage rises but the real wage remains unchanged. In the capital market only nominal saving, nominal investment and nominal ROI increase but real saving, investment and ROI remain unchanged.

Since there is no change in any of the real variables there is no change in full employment. In the full employment model, change in supply of money has no real effect on the economy. The money is neutral. The relationship between the real variables is completely independent of changes in the nominal variables. This independence is called classical dichotomy

THE KEYNESIAN SYSTEM

In classical view, supply-side factors are more important than the demand-side factors. According to Say's law of market, supply creates its own demand. Further, as price and wage rate are flexible, equilibrium is attained always.

There is no scope for unemployment and output is always at full employment level. As supply and demand forces lead to an optimum condition for the economy, there is no need for government intervention. The Great Depression, however, belied these beliefs.

During the 1930s there was widespread unemployment, poverty, and insecurity among households. At this point, Keynes provided an altogether different insight into the problems confronting major economies. Some of the salient features of Keynesian economics are presented below.

a) Demand Creates its Supply: Just opposite to the classical view, Keynes proposed that demand for a product encourages producers to come up with products demanded. If there is idle capacity in the economy, output will increase if aggregate demand increases.

b) Rigidities in Prices and Wage Rate: Prices and wage rate are not flexible as suggested by classical economists. Suppliers have monopoly power; perfectly competitive markets do not exist. As we receive our wages and salaries in nominal terms, we resist downward movements in wages and salaries. There are several contracts which do not allow immediate revision in

prices and wages. Moreover, adjustments in prices and wage rate are staggered over a period of time; adjustments are not instantaneous.

c) Unemployment in Economy: Classical economists ruled out the possibility of unemployment in the economy. According to Keynes, unemployment is normal for an economy. Periodic fluctuations in unemployment can be neutralised by government intervention.

d) Government Intervention: If aggregate demand is falling short of aggregate supply, in the Keynesian system the government should increase its spending. Thus in the Keynesian system government has an active and important role in the economy. If there is large scale unemployment in the economy, the government should create jobs through investments in productive activities. If inflation is high, the government should adhere to restrictive policies to reduce the level of aggregate demand.

e) Aggregate Supply Curve: According to classical economists, aggregate supply curve is vertical. The classical economists however were referring to the long run situations. According to Keynes, short runs are also important. In the short run the aggregate supply curve is horizontal, if the available resources in the economy are under-utilised. An implication of the above is that increase in aggregate demand will result in an increase in output, without increasing prices.

Keynesian Fixed Price Models

Keynesian Cross model

The expenditure-output model, sometimes also called the Keynesian cross diagram, determines the equilibrium level of real GDP by the point where the total or aggregate expenditures in the economy are equal to the amount of output produced. The axes of the Keynesian cross diagram presented in fig show real GDP on the horizontal axis as a measure of output and aggregate expenditures on the vertical axis as a measure of spending.
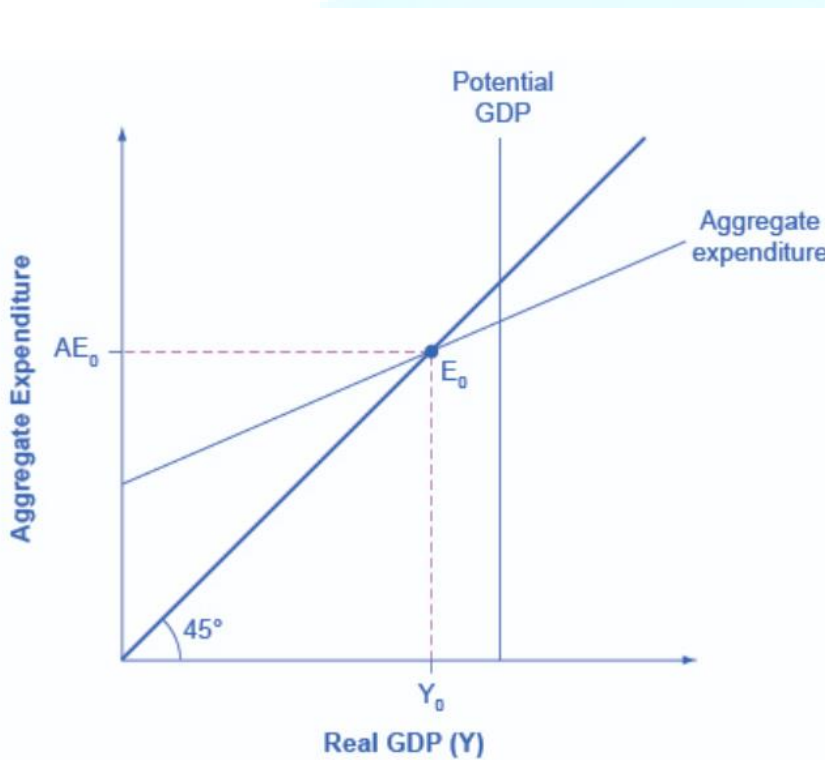
Classical vs. Keynesian Theory

The following are some of the basic comparisons for a Keynesian economics vs. Classical economics study: Keynes refuted Classical economics' claim that the Say's law holds.

The strong form of the Say's law stated that the "costs of output are always covered in the aggregate by the sale proceeds resulting from demand". Keynes argued that this can only hold true if the individual savings exactly equal the aggregate investment.

While Classical economics believes in the theory of the invisible hand, where any imperfections in the economy get corrected automatically, Keynesian economics rubbishes the idea.

Keynesian economics does not believe that price adjustments are possible easily and so the self-correcting market mechanism based on flexible prices also obviously doesn't.

The Keynesian economists actually explain the determinants of saving, consumption, investment and production differently than the classical economists.

Classical economists believe that the best monetary policy during a crisis is no monetary policy.

The Keynesian theorists on the other hand, believe that Government intervention in the form of monetary and fiscal policies is an absolute must to keep the economy running smoothly. Classical economists believed in the long run and aimed to provide long run solutions at short run losses.

Keynes was completely opposed to this, and believed that it is the short run that should be targeted first.

Keynes thought of savings beyond planned investments as a problem, but Classicalists didn't think so because they believed that interest rate changes would sort this surplus of loanable funds and bring the economy back to an equilibrium.

Keynes argued that interest rates do not usually fall or rise perfectly in proportion to the demand and supply of loanable funds. They are known to overshoot or undershoot at times as well.

Both Keynes and the Classical theorists however, believed as fact, that the future economic expectations affect the economy. But while Keynes argued for corrective Government intervention, Classical theorists relied on people's selfish motives to sort the system out.

Liquidity trap

Liquidity trap refers to a situation in which an increase in the money supply does not result in a fall in the interest rate but merely in an addition to idle

balances: the interest elasticity of demand for money becomes infinite. Under normal conditions an increase in money supply, resulting in excess cash balances, would cause an increase in bond prices, as individuals sought to acquire assets in exchange for money, and a corresponding fall in interest rates.

The horizontal portion of the liquidity preference curve is referred to as the liquidity trap. In this portion of the curve, the demand for money is infinitely elastic with re-spect to the interest rate. Re-ductions in the interest rate, in this portion only, increases people's desire to hold cash balances.

The implication here is that any attempt to achieve the internal expansion through increased investment brought about by lowering the interest rates would fall, because any increase in the money supply created in order to reduce the rate of interest would be held in the form of cash balances, making it impossible to use interest rates (monetary policy) to expand the economy.
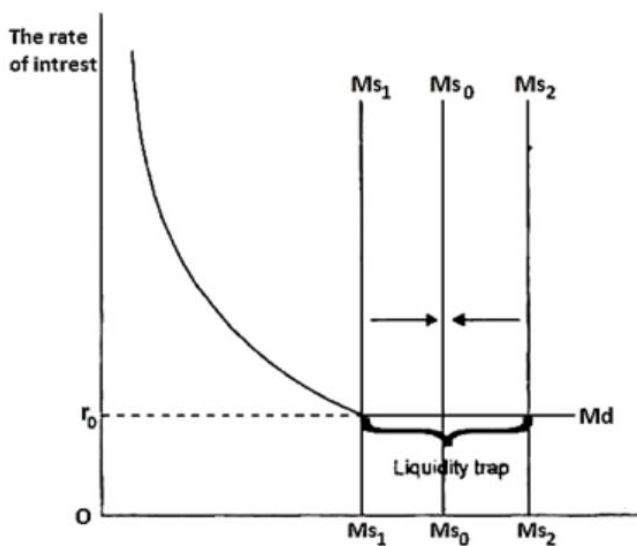

Fig. 7 : Liquidity Trap

Keynes pointed out that the actual rate of interest cannot fall to zero because the expected rate cannot fall to zero. People's expectations play a very important role in altering the rate of interest. Individuals' views on the level of bond prices may be summarised in terms of their views about the interest rate.

Crowding out Effect

Crowding out is a phenomenon that occurs when increased government involvement in a sector of the market economy substantially affects the remainder of the market, either on the supply or demand side of the market. One type frequently discussed is when expansionary fiscal policy reduces investment spending by the private sector.

The government spending is "crowding out" investment because it is demanding more loanable funds and thus causing increased interest rates and therefore reducing investment spending. This basic analysis has been broadened to multiple channels that might leave total output little changed or even smaller.

Other economists use "crowding out" to refer to the government providing a service or good that would otherwise be a business opportunity for private

industry, and be subject only to the economic forces seen in voluntary exchange

Behavioural economists and other social scientists also use "crowding out" to describe a downside of solutions based on private exchange: the crowding out of intrinsic motivation and prosocial norms in response to the financial incentives of voluntary market exchange.

What factors determine how much crowding out takes place?

The extent to which interest rate adjustments dampen the output expansion induced by increased government spending is determined by:

- Income increases more than interest rates increase if the LM (Liquidity preference—Money supply) curve is flatter.
- Income increases less than interest rates increase if the IS (Investment—Saving) curve is flatter.
- Income and interest rates increase more the larger the multiplier, thus, the larger the horizontal shift in the IS curve

Keynes effect

The Keynes effect is the effect that changes in the price level have upon goods market spending via changes in interest rates. As prices fall, a given nominal money supply will be associated with a larger real money supply, causing interest rates to fall and in turn causing investment spending on physical capital to increase.

This implies that insufficient demand in the product market cannot exist forever, because insufficient demand will cause a lower price level, resulting in increased demand.

There are two cases in which the Keynes effect does not occur:

- in the liquidity trap (when the LM curve is horizontal and thus changes in the real money supply do not affect interest rates), and
- when expenditure is inelastic with respect to (unresponsive to) interest rates (when the IS curve is vertical).

The Patinkin-Pigou real balance effect

suggests that due to wealth effects of changes in the price level upon spending itself, insufficient demand cannot persist even in the two cases in which the Keynes effect does not operate.

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Inflation

Inflation is often defined in terms of its supposed causes. Inflation exists when money supply exceeds available goods and services. Or inflation is attributed to budget deficit financing. A deficit budget may be financed by the additional money creation. But the situation of monetary expansion or budget deficit may not cause the price level to rise. Hence the difficulty of defining 'inflation'.

Inflationary Gap

An inflationary gap is the difference in what gross domestic product (GDP) would be under full employment and the actual reported GDP number. It is the increase in real GDP that causes inflation, and the inflationary gap is used to assess and quantify the pressure of inflation.

Economists look at inflationary gaps as a way to understand how inflation leads to increased output. This helps evaluate the magnitude and effects of inflation, which may be good for some industries and individuals, and harmful for others. Usually, inflation is associated with high employment, so the number of people working is the starting point for the analysis.

Example of Inflationary Gap

An inflationary gap occurs when the economy is operating above full employment. It represents the extra output as measured by GDP between what it would be under the natural rate of unemployment and the reported GDP number. Think of it as the rise in GDP driven by inflation.

Types of Inflation

The different types of inflation in an economy can be explained as follows: Types of Inflation from the quantitative point of view

Creeping inflation the rate of inflation doesn't exceed the rate of production growth, Creeping inflation is < 10%

Galloping inflation the rate of inflation exceeds the rate of production growth, Galloping inflation is from 10% to 100%. Money loses purchasing power, people hold as little money as possible.

 Hyperinflation is inflation that is "out of control", a condition in which prices increase rapidly as a currency loses its value. Hyperinflation is over 100% per year. Prices as well as wages are extremely erratic. Money have no value and barter trade emerges

Open inflation if economic imbalance is accompanied with rising price level.

Suppressed inflation

  if state authorities damp or even stop the rise of price level by administrative means. Such a situation is followed by the existence of scarce commodities, shadow economy etc. In such cases the provision of basic necessities such as agricultural products is set by the government by introducing price controls on commodities

 Hidden inflation government imposes strict controls to curb price inflation, producers are forced to sell the products at the prices required. Producers can not sell the commodity at higher prices to get the profit, therefore, lower the quality of products. This means that employers are selling lower quality products at higher prices -> inflation is hidden.

Demand-Pull Inflation

This type of inflation is caused due to an increase in aggregate demand in the economy.
Arises when aggregate demand in an economy outpaces aggregate supply
It involves inflation rising as real gross domestic product rises and unemployment falls. This is commonly described as "too much money chasing too few goods

Causes of Demand-Pull Inflation:

- A growing economy or increase in the supply of money – When consumers feel confident, they spend more and take on more debt. This leads to a steady increase in demand, which means higher prices.

- Asset inflation or Increase in Forex reserves– A sudden rise in exports forces a depreciation of the currencies involved.

- Government spending or Deficit financing by the government – When the government spends more freely, prices go up.

- Due to fiscal stimulus.

- Increased borrowing.

- Depreciation of rupee.

- Low unemployment rate.

Effects of Demand-Pull Inflation:

- Shortage in supply

- Increase in the prices of the goods (inflation).

- The overall increase in the cost of living.

Cost-Push Inflation

This type of inflation is caused due to various reasons such as:

it is a type of inflation caused by large increases in the cost of important goods or services where no suitable alternative is available

- Increase in price of inputs

- Hoarding and Speculation of commodities

- Defective Supply chain

- Increase in indirect taxes

- Depreciation of Currency

- Crude oil price fluctuation

- Defective food supply chain

- Low growth of Agricultural sector

- Food Inflation

- Interest rates increased by RBI

Cost pull inflation is considered bad among the two types of inflation. Because the National Income is reduced along with the reduction in supply in the Cost-push type of inflation.

Lipsesy's excess demand model

Lipsey in 1960 provided a sound theoretical basis for the statistical relation observed by Phillips. He argued that the observed inverse relationship between wage inflation and unemployment can be derived from two behavioural relations:

(a) A positive relation between the rate of money wage change and the magnitude for excess demand for labour and

(b) An inverse non-linear relation between excess labour demand and unemploy-ment. These relations refer to a single micro labour market.

1. Relation between Wage Inflation and Excess Demand:

Lipsey assumed that wage inflation (w) is an increasing function of the proportionate excess demand for labour.

At the origin, excess demand is zero and as a result wage inflation will be zero. To the right of the origin, excess demand is positive so that money wages will be rising. To the left of the origin, excess demand is negative or there exists excess supply and as a result, money wages will be falling.

2. Relation between Excess Demand and Unemploy-ment:

The negative relation implies that greater the excess demand, the lower will be the level of unemployment and vice versa. When excess demand is zero the labour market is in equilibrium. But this does not indicate the absence of unemployment.

Lipsey measured the excess demand for labour by only the excess of the number of vacancies over the number of the un-employed. Thus, zero excess demand for labour can occur at a positive unemployment rate.

The unemployment compatibility with zero excess demand is called frictional un-employment (uf). Frictional unemployment arises because the process of matching vacancies with unemployed workers is not instantaneous.

The non-linear relation implies that while positive ex-cess demand for labour will decrease the unemployment rate below frictional level (uf), it can never fall below zero however high is the level of excess demand

Phillips Curve

 The concept of Phillips curve was given by A.W.Phillips in 1958. He published a comprehensive study of wage behaviour in the United Kingdom for the years 1861-1957. The main findings as summarised from his article "The relation between Unemployment and Rate of Changes in Money Wages in the United Kingdom, 1861-1957" states:

The Phillips curve is an inverse relationship between the rate of unemployment and the rate of increase in money wages. The higher the rate of unemployment, the lower the rate of wage inflation. In other words, there is a trade-off between wage inflation and unemployment.
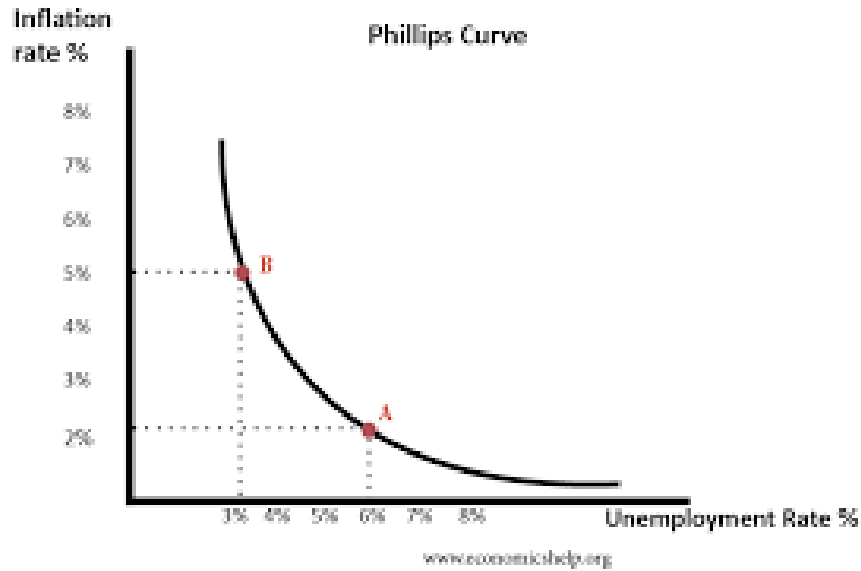
Phillips Curve

Modified Phillips Curve

The simple Phillips curve relationship fell apart after the 1960s, both in Britain and in the United States. Following figure shows the behaviour of inflation and unemployment in the United States over the period since 1960. The data for the 1970s and 1980s do not fit the simple Phillips curve story.

The Samuelson-Solow modification of the Phillips curve
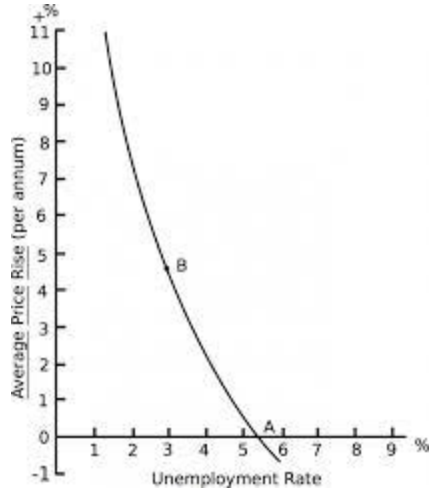
Tobin's Modified Phillips Curve
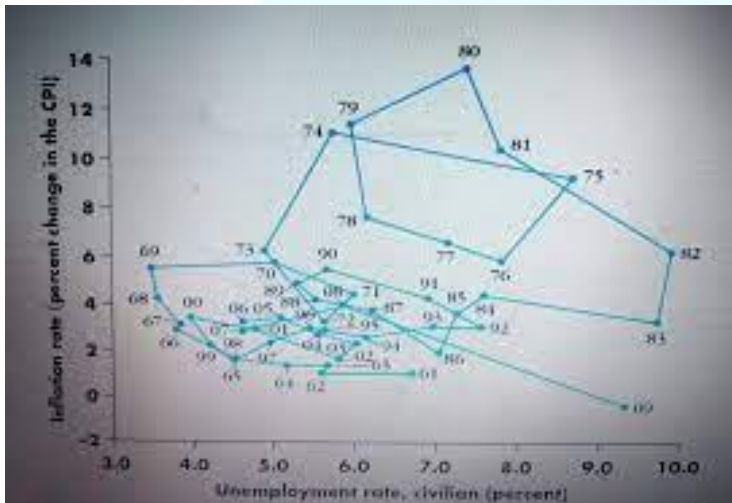
Neo-Keynesian model

Just as Keynes posited his theory in response to gaps in classical economic analysis, Neo-Keynesianism derives from observed differences between Keynes's theoretical postulations and real economic phenomena.

- The Neo-Keynesian theory was articulated and developed mainly in the U.S. during the post-war period. Neo-Keynesians did not place as heavy an emphasis on the concept of full employment but instead focused on economic growth and stability.

- The reasons the Neo-Keynesians identified that the market was not self-regulating were manifold.

- First, monopolies may exist, which means the market is not competitive in a pure sense. This also means that certain companies have discretionary powers to set prices and may not wish to lower or raise prices during periods of fluctuations to meet demands from the public.

- Labour markets are also imperfect. Second, trade unions and other companies may act according to individual circumstances, resulting in a stagnation in wages that does not reflect the actual conditions of the economy.

- Third, real interest rates may depart from natural interest rates as monetary authorities adjust the rates to avoid temporary instability in the macroeconomy.

Equilibrium and Disequilibrium in the Keynesian Model
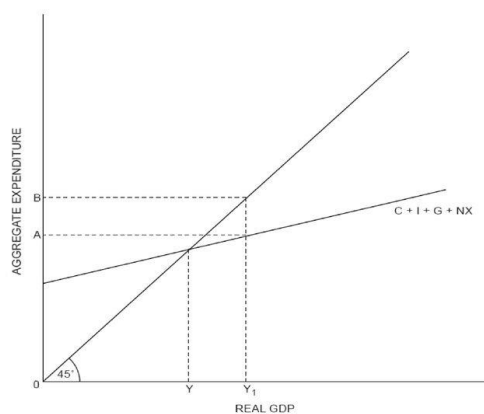
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Walrasian Vs. Keynesian Models.

- Walrasian economics and the neoclassical-Keynesian synthesis Walrasian general-equilibrium analysis in the form we have it today was only developed from the late 1930s onwards, i.e. at the same time as the neoclassical-Keynesian synthesis was emerging from Keynes's work on unemployment.

- The interpretation of Keynes's General Theory was grafted onto Walrasian general-equilibrium analysis.

- A prime-mover in this development IS further account of these models is provided by Weintraubwas Hicks whose IS LM apparatus became so widely used.

- In the 1930s Hicks was also working on value theory from a Walrasian perspective and in 1939 published Value and Capital, which has formed

the basis of much microeconomic analysis, particularly in demand theory.

- The ISLM model makes use of Walras's law. The model contains three markets, goods, money and bonds, but determines only two variables, the interest rate and either the price level or real output.

- To prevent the model being over-determined one market must be discarded. This is done using Walras's law.

- If the goods and money markets are both in equilibrium, then, since excess demands must sum to zero, the bond market must also be in equilibrium and the excess demand function for bonds is a dependent equation.

- The final stage in the creation of the neoclassical-Keynesian synthesis was Patinkin's Money, Interest and Prices which included money in a Walrasian economy.

- This analysis obtained the standard (neo-)classical results discussed above namely the neutrality of money and the impossibility of unemployment equilibrium when prices and wages are flexible.

A pure exchange Walrasian model

- The simplest kind of Walrasian economy is one in which there is no production of goods; only the exchange of already existing goods takes place. The economy consists of a large number of independent traders.

- Each starts with a given initial endowment of goods, of which there are a large number.

- Each trader's utility is a function of the quantities of the various goods he consumes and it is assumed that traders aim to maximise their utility. To do this they have to exchange goods.

- The basic Walrasian model is a barter economy.

- All exchange takes the form of swapping goods for goods, as there is no money in the model; there is no commodity which acts as a medium of exchange or as a store of value; and there is no role for a store of value or for assets, as the model is timeless.

- It is concerned with exchange in one period of time, divorced from any past or future time periods. These simplifications will be later modified or commented upon.

- Equilibrium can only be established once all possibilities for mutually advantageous exchange between the traders have been exhausted.

- Each trader's utility depends on the quantities of the various goods which he or she consumes in the period. We assume that there are m goods available. Formally the utility function is

$$U_i = f(q_{i1}, q_{i2}, \ldots, q_{ig}, \ldots, q_{im}) \tag{16.1}$$

where

U_i = utility of ith trader in goods
q_{ig} = quantity of gth good consumed by the ith individual, and there are m different goods

- The individual trader's choice problem is to maximise his utility from consumption subject to the constraint on his desired purchases imposed by the value of his initial endowment.

- The budget constraint is that the total value of goods demanded by the trader must equal the value of his initial endowment and is written as

$$\sum_{g=1}^{m} p_g\, q_{ig}^d = \sum_{g=1}^{m} p_g\, \bar{q}_{ig}^s \qquad\qquad (16.2)$$

where

$p_g =$ the price of the gth good
$q_{ig}^d =$ quantity of gth good demanded by trader i
$q_{ig}^s =$ quantity of gth good in trader i's fixed initial endowment

Walras's law

- In a Walrasian economy particular importance attaches to the idea that each trader makes his demand and supply plans on the basis that he can buy and sell as much of any good as he wants to at the prevailing set of prices, given his budget constraint.

- This means that the sum of each trader's demands for the goods must equal the value of his initial endowment as stated in the budget constraint,No trader plans to spend more than his income or earn income in excess of his planned purchases.

- So although a trader's excess demand for a particular good may be positive or negative, when we sum over all his excess demands for all the goods, the sum must equal zero because of the budget constraint.
- If the trader has a positive excess demand over m - 1 of the goods, he must have an equal positive excess supply of the mth good in order to finance his planned net purchase of the m - 1 goods.
- If the sum of excess demands over an m goods equals zero for one trader, then it must also equal zero for any traders and hence for the economy as a whole.
- This result, which is a consequence of the budget constraint, is known as Walras's law.
- Walras's law states that the sum of excess demands over all the goods in the economy must equal zero and this applies whether or not the markets are in general equilibrium.
- So if there is positive excess demand over m - 1 markets, there must be negative excess demand (that is, positive excess supply) in the mth market.

Uncertainty and time in Walrasian models

- Walrasian models take full account of both time and uncertainty. Traders face an array of possible future states of the world. Hence the future has to be planned for and is uncertain.

- The choices made by traders are now more complex since they enter into exchange contracts for each possible state of the world.

- For example, trade will take place at one set of prices if the quantity of oil available is halved and at another set of prices if it is doubled.

- Such contracts are called contingent contracts since their actual execution is contingent on the state of the world that emerges.

- This type of Walrasian model contains many more markets than the timeless variety. If there are Z possible states of the world and g commodities to be traded over a time horizon of T periods, then there will be ZgT markets.

- In other words, markets exist not just for present-period exchange but there are also futures markets which establish prices for each contingency.

- There is now a proper role for asset markets as the uncertain future needs to be planned for in the present.

Disequilibrium models of Robert Clower Leijonhufvud, Barro-Grossman and Malinvaud

- Disequilibrium macroeconomics is a tradition of research centred on the role of disequilibrium in economics.

- This approach is also known as non-Walrasian theory, equilibrium with rationing, the non-market clearing approach, and non-tâtonnement

theory. Early work in the area was done by Don Patinkin, Robert W. Clower, and Axel Leijonhufvud.

- Their work was formalised into general disequilibrium models, which were very influential in the 1970s. American economists had mostly abandoned these models by the late 1970s, but French economists continued work in the tradition and developed fixed price models.

- In the neoclassical synthesis, equilibrium models were the rule. In these models, rigid wages modelled unemployment at equilibrium. These models were challenged by Don Patinkin and later disequilibrium theorists.

- Patinkin argued that unemployment resulted from disequilibrium.Patinkin, Robert W. Clower, and Axel Leijonhufvud focused on the role of disequilibrium. Clower and Leijonhufvud argued that disequilibrium formed a fundamental part of Keynes's theory and deserved greater attention.

- Robert Barro and Herschel Grossman formulated general disequilibrium models,in which individual markets were locked into prices before there was a general equilibrium.

- These markets produced "false prices" resulting in disequilibrium Soon after the work of Barro and Grossman, disequilibrium models fell out of favour in the United States and Barro abandoned Keynesianism and adopted new classical, market-clearing hypotheses.

-

- Malinvaud used disequilibrium analysis to develop a theory of unemployment. He argued that disequilibrium in the labour and goods markets could lead to rationing of goods and labour, leading to unemployment.

- Malinvaud adopted a fixed price framework and argued that pricing would be rigid in modern, industrial prices compared to the relatively flexible pricing systems of raw goods that dominate agricultural economies.In Malinvaud's framework, prices are fixed and only quantities adjust.

- Malinvaud considers an equilibrium state in classical and Keynesian unemployment as most likely. He pays less attention to the case of repressed inflation and considers underconsumption/unemployment a theoretical curiosity.

- Work in the neoclassical tradition is confined as a special case of Malinvaud's typology, the Walrasian equilibrium. In Malinvaud's theory, reaching the Walrasian equilibrium case is almost impossible to achieve given the nature of industrial pricing.

- Malinvaud's work provided different policy prescriptions depending on the state of the economy. Given Keynesian unemployment, fiscal policy would shift both the labour and goods curves upwards leading to higher wages and prices.

- With this shift, the Walrasian equilibrium would be closer to the actual economic equilibrium. On the other hand, fiscal policy with an economy in the classical unemployment would only make matters worse. A policy

leading to higher prices and lower wages would be recommended instead.
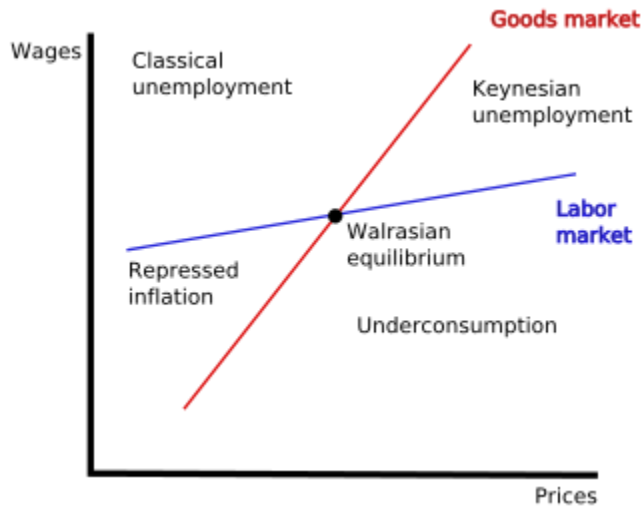
- Diagram based on Malinvaud's typology of unemployment shows curves for equilibrium in the goods and labour markets given wage and price levels. Walrasian equilibrium is achieved when both markets are at equilibrium. According to Malinvaud the economy is usually in a state of either Keynesian unemployment, with excess supply of goods and labour, or classical unemployment, with excess supply of labour and excess demand for goods.