I. Introduction to Macroeconomic Equilibrium

Macroeconomics seeks to develop theoretical tools called models to describe the processes determining variables like national income, employment, and price levels.

The analysis of income determination provided here is based on the theory given by John Maynard Keynes. For the purpose of this model, we assume a short-run environment where the price level of final goods and the rate of interest remain constant.

Under these conditions, the aggregate output is determined solely by the level of aggregate demand, a concept known as the effective demand principle.

II. Aggregate Demand and Its Components

In macroeconomic theory, it is vital to distinguish between ex ante (planned) and ex post (actual) measures. Ex ante consumption and investment represent what people and firms plan to consume or invest, while ex post measures reflect what actually happened.

1. **Consumption (C):** The most significant determinant of consumption demand is household income. The consumption function ($C=\bar{C}+cY$) describes this relationship.

Autonomous Consumption ($\bar{C}$): This is the level of consumption that takes place even if income is zero. It represents subsistence spending.

Induced Consumption (cY): This component shows the dependence of consumption on income (Y).

Marginal Propensity to Consume (MPC or c): The rate of change in consumption as income changes ($MPC=\Delta C/\Delta Y$). Generally, MPC lies between 0 and

Average Propensity to Consume (APC): Consumption per unit of income (C/Y).

2. Investment (I): Investment refers to additions to the stock of physical capital, such as machines and buildings, and changes in inventory.

- **Autonomous Investment ($\bar{I}$):** In this model, we assume firms plan to invest the same amount every year, regardless of the level of income.
- Investment decisions are often influenced by the market rate of interest, which acts as the cost of investible funds.

3. Aggregate Demand (AD) Function: In a two-sector model (households and firms), AD is the sum of ex ante consumption and ex ante investment: $AD=\bar{C}+\bar{I}+cY$. By combining autonomous terms into A, the equation becomes $AD=A+cY$.

III. Determination of Income in a Two-Sector Model

The macroeconomy is in equilibrium when the planned supply of final goods (GDP or Y) equals the planned aggregate demand (AD).

1. The Equilibrium Condition: Equilibrium is reached when $Y=AD$, or $Y=A+cY$. Algebraically, this solves to $Y=A/(1-c)$.

2. Graphical Representation:

- **Aggregate Supply:** This is represented by a 45-degree line starting from the origin. Because the price level is fixed and there are unused resources, whatever is demanded will be supplied. Every point on this line has equal horizontal and vertical coordinates ($Supply=Income$).
- **Aggregate Demand:** The AD line has a positive intercept (A) and a positive slope (c).
- **Equilibrium Point:** The point where the AD line intersects the 45-degree line is the macroeconomic equilibrium.

3. Inventory Dynamics: If ex ante demand falls short of planned output, unintended accumulation of inventories occurs in warehouses.

Conversely, if demand exceeds planned output, inventories are depleted unexpectedly. Actual output (Y) always equals actual consumption plus actual investment because unintended inventory changes reconcile the two.

IV. The Multiplier Mechanism

The investment multiplier explains how an initial change in autonomous expenditure leads to a more than proportionate change in equilibrium income.

1. The Process: When autonomous investment increases by 10 units, income initially rises by 10. This additional income leads to increased consumption based on the MPC.

For example, if $MPC=0.8$, consumption rises by 8 in the next round, which then becomes income for others, leading to another round of spending ($0.8\times8=6.4$).

2. The Formula: The multiplier (k) is the ratio of the total change in income (ΔY) to the initial change in autonomous spending (ΔA).

- $Multiplier=1/(1-MPC)=1/MPS$.
- A higher MPC results in a larger multiplier.

3. The Paradox of Thrift: This principle states that if everyone in the economy attempts to save more (increasing the Marginal Propensity to Save or MPS), the total value of savings in the economy will either remain unchanged or decline.

While an individual can save more by consuming less, if the whole economy does so, aggregate demand falls, leading to a decrease in total output and income, which eventually brings total savings back down.

V. Problems of Excess and Deficient Demand

The equilibrium level of output determined by $Y=AD$ does not necessarily correspond to the full employment level of income. Full employment is where all factors of production are fully utilised.

1. Deficient Demand: This occurs when the equilibrium level of output is less than the full employment level. It happens because aggregate demand is insufficient to employ all factors of production. In the long run, this situation can lead to a decline in prices.

2. Excess Demand: This occurs when ex ante aggregate demand exceeds the level of output produced at full employment. It creates a gap where demand is higher than available supply, which leads to a rise in prices (inflation) in the long run.

VI. Measures to Correct Demand Imbalances

The government performs a stabilisation function by intervening to correct fluctuations in income and employment through fiscal and monetary policies.

1. Fiscal Policy (Government Spending and Taxes): The government affects AD directly through spending (G) and indirectly through taxes (T) which affect disposable income ($Y_d=Y-T$).

- **Changes in Government Spending (G):** Increasing G shifts the AD schedule upward. The government spending multiplier is $1/(1-c)$, identical to the investment multiplier.

- **Changes in Taxes (T):** A tax increase reduces disposable income and consumption, shifting AD downward. The tax multiplier is $-c/(1-c)$. It is negative because higher taxes reduce output, and it is smaller in absolute value than the spending multiplier because taxes only affect the consumption portion of AD.

- **Balanced Budget Multiplier:** If an increase in G is matched by an equal increase in T, the equilibrium income rises by exactly the amount of the increase in G. The balanced budget multiplier is equal to 1.

2. Monetary Policy (Money Supply): The monetary authority (like the RBI in India) can regulate the volume of money in the economy to maintain price stability.

- **Open Market Operations (OMO):** The central bank buys or sells government securities to increase or decrease the money supply.

- **Impact on AD:** Increasing the money supply generally leads people to purchase bonds, which raises bond prices and lowers the rate of interest. Lower interest rates encourage private investment, thereby increasing aggregate demand.

3. Automatic Stabilisers: These are built-in spending and tax rules that automatically increase expenditures or decrease taxes when economic conditions worsen (like unemployment benefits), thereby stabilising the economy without deliberate discretionary action.

VII. Considerations for an Open Economy

In an open economy, exports (X) and imports (M) must be included in the AD function.

- **Exports:** These represent foreign demand for domestic goods and add to AD.
- **Imports:** These represent domestic demand for foreign goods and act as a leakage from the circular flow of domestic income.
- **The Multiplier in an Open Economy:** The open economy multiplier is smaller than the closed economy multiplier ($1/(1-c+m)$, where m is the marginal propensity to import). This is because a portion of any income increase is spent on foreign goods rather than domestic ones.