

Lectures On Intermediate Macroeconomics

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ECONOMICS DEPARTMENT COURSE OUTLINE

ECO 211 Intermediate Macroeconomics 3 Units
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Purpose

The purpose of this course is to expose the learner to mathematical analysis of Macroeconomics.

Course Content

1.0 INTRODUCTION

- 1.1 The scope and developments of Macroeconomics
- 1.2 National Income Accounting

2.0 THE BASIC MACROECONOMIC MODEL

- 2.1 A review of Fundamentals of Macroeconomics, output, inflation and employment.
- 2.2 Introduction to theories of Income determination.
- 2.3 Consumption, Saving and Income determination.
- 2.4 Theories of Consumption
- 2.5 Investment Demand.
- 2.6 The theory of aggregate demand (I) -The derivation of IS-curve
- 2.7 Demand for, and supply of money
- 2.8 Theory of Aggregate Demand (II)- the derivation of LM curve
- 2.9 Macroeconomic stabilization policies and application of the IS-LM curves.
- 2.10 Monetary and Fiscal Policy mix.

3.0 EMPLOYMENT, INFLATION AND BUSINESS CYCLES

- 3.1 Types and causes of unemployment
- 3.2 Types and causes of inflation.
- 3.3 Linkages between inflation and unemployment: empirical evidence
- 3.4 Types and causes of business cycles.

Prerequisites: ECO 111, ECO 210,

Course Objectives

The course aims to;-

- a) Provide the student with a solid understanding of macroeconomics at the intermediate level
- b) To ensure that students can apply macroeconomic analysis to the study of economic problems.
- c) Provide students with the central concepts of decision-making in a market framework.

Expected Learning Outcomes

By the end of this course the learner is expected to be able to;-

- a. Understand theories for determinants of economic growth, including the impact macroeconomic policies may have on economic growth,
- b. Understand how supply and demand decisions are made in markets for factors of production, and the implications for equilibrium in these markets,
- c. Explain various theories for business cycle fluctuations and be able to prescribe and evaluate policy responses,
- d. Understand the determinants of the demand and supply for money and be able to evaluate the impact changes in the market for money have on the economy as a whole, and
- e. Accomplish these objectives above using quantitative skills and graphical models of the macro-economy.

Learning and Teaching Methodologies

Lectures, Tutorials, Group Discussions, Presentations and Term Paper writing

Course Assessment

Assessment	weight
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CAT'S	30%
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End of Semester Exam	70%
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Total	100%
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Instructional Materials and Equipment:

LCD/Projectors; Test books;

Course Texts/References

1. D., Rudiger and Stanley Fischer (1987): *Macroeconomics*, Fifth edition, Newyork: McGraw-Hill.
2. William H. Branson : (1989) *Macroeconomic Theory and Policy*, Harper & Row Publishers, 2nd Edition. New York
3. Thomas F. Denburg, (1989) *Macroeconomics*, McGraw - Hill Kogakusha Ltd. Tokyo
4. J. M. Keynes: (1936) *The General Theory of Employment, Interest, and Money*, Harcourt Brace. New York
5. Gardner Ackley: (1973), *Macroeconomics: Theory and Policy*, Macmillan Pub. Co. Inc.New Delhi
6. A. J. Westway & T.C. Weyman - Jones: *Macroeconomics Theory, Evidence and Policy*, Longman.
7. M. J. Bailey: (1971), National Income and the Price Level: *A study in Macroeconomic Theory*, McGraw-Hill. New York

Chapter one

1.0 Introduction

The modern economics science has two major branches i.e. Micro-economics and Macro-economics. Compared to micro-economics Macro-economics is a younger branch of economics. Until the economic depression of 1930^s economics was limited to what is currently Micro-economics.

Macro-economics was born in 1936 with the publication of John Maynard Keynes revolutionary book entitled the great theory of employment, interest and money. The interpretation of the Keynesian thought lead to the growth of macro-economics.

What is Macro-Economics

There have been several definitions to the term macro-economics and still we are yet to get more definitions since economics is a dynamic field.

According to **Kenneth E Boulding** “ Macro-economics is the study of the nature, relationships and behavior of aggregates of economic quantities.....Macro-economics... deal not with individual quantities as such but with aggregates of these quantities..... not with individual incomes, but with the national income, not with individual prices , but with price levels, not with individual output, but with the national output”.

P.A. Samuelson said that “Macro-economics is the study of the behavior of the economy as a whole. It examines the overall level of output, employment, prices and foreign trade”.

We can therefore say that *Macro-economics* is essentially the study of the behavior and performance of the economy as a whole. More importantly it studies the relationship and interaction between the factors or forces that determine the level and growth of national output and employment, general price level and Balance of Payments positions of an economy. This definition should however be treated as working definition.

1.1 ORIGIN AND GROWTH OF MACRO-ECONOMICS

Macroeconomics as mentioned earlier is of recent origin. It started with keynessian publication. This however does not mean that economist of post Keynesian had not given though to Macro-economic Problems. The use of

macroeconomic approach to certain economic issues can be traced back to the writings of the 16th century economists called “Mercantilists” and those of the later era. Here is a brief review of growth of macroeconomics beginning with classical thought.

a) Classical Macro-economics.

The school of economic thoughts that dominated the economic world before the Keynesian Revolution is called the classical school of thought. The classical economist had not developed any coherent macroeconomic Theory or Model. Their macroeconomic thoughts were in the form of postulates.

According to them if the free forces of market i.e. Demand and Supply are allowed to work freely the following will be observed.

- i) There will always be full employment in the long-run and if unemployment it will be only a short-run phenomena.
- ii) There will be neither over production nor under-production at the Aggregate level
- iii) The economy will always be in equilibrium in the long-run

However the economic depression of 1930^s proved all the classical postulates wrong. It exposed the weakness of Laissez faire doctrine. i.e. there was unemployment in most free market zones, the classicalist could neither offer an explanation nor solution to the problem hence making the collapse of classical economist.

b) The Keynesian Revolution

The collapse of classical economics necessitated a fresh look at the operation of economic systems and divesting corrective policy measures against the market failures. The great task was done by J.M. Keynes in his General theory which laid foundation of macro-economics. Keynesian school of thought was born out of the attempt by J.M. Keynes to offer explanation and solution to economic problems associated with the Great Depression.

The Keynesian Macro-economic theories are associated mainly with a) Employment b) growth and c) stability. The central theme of the Keynesian Macro-economics may be summarized as follows.

- i) The level of output and employment in an economy is determined by the aggregate demand given the resources.
- ii) The unemployment in any country is caused by lack of aggregate demand and economic fluctuations are caused by demand deficiency.
- iii) The demand Deficiency can be removed through compensatory government spending.

Keynessian economics stressed the role of demand management by the government for the stable growth of the economy.

However, the real economic world has never conformed to any particular economic thoughts or principles; Idea or Ideology. It goes through a continuous process or Revolution. It passes from one system to another, rendering prevailing thoughts, ideas and laws redundant and forcing economist to examine the relevance of existing theories and find new explanation to emerging economic conditions

c) Post-Keynessian Developments in Macro-economics

The Keynesian economics started showing signs of its failures in the early 1970^s. Keynessian economics especially fiscal policy failed to provide solution to economic problems of:- low growth, high unemployment and ever increasing rate of inflation faced by most developing economies.

This lead to the growth of new schools of thought that attempted to explain some of this problems with their solutions among them included;-

- a) Monetarist school by Milton Friedman
- b) Neo-classical macroeconomics by Robert Lucas
- c) Supply-side economics by Arthur Lafter
- d) Neo-Keynesianism.
- e) Etc

1.2 IMPORTANCE OF MACR-ECONOMICS.

1) Growing importance of macroeconomic issues.

Macro-economic issues of a country need to be resolved effectively as they pertain to the economic fate of a country and its people.

2) Persistence of macro-economic problems.

It is noted that both developed and developing countries are constantly confronted with some or other kind of macroeconomic problems, e.g. economic recession and depression, Unemployment, persistent inflation and stagflation, BOP deficits, outflow of capital among others have necessitated continuous monitoring and assessing of economic situation and developing appropriate policies.

3) Growing complexity of economic systems.

The modern economic systems has grown extremely complex due to i) Unstable human desires ii) increasing economic integration iii) increased international flows of capital etc. this has therefore called for the importance of macroeconomics.

4) The need for government intervention due to market failures.

5) The use of macroeconomics in business management.

CHAPTER TWO

MACROECONOMIC ISSUES, CONCEPTS AND MODEL BUILDING

2.0 INTRODUCTION.

The major objective of this section is to give a broader view of macroeconomics and present the method of analysis. The key areas of will include

- i) Macroeconomic issues- This are the economic problems that have often been confronted by different countries at different times in history
- ii) Macroeconomic concepts - These are the analytical concepts that are used in the study of macroeconomics.
- iii) Macroeconomic model building.- It entails the construction of a framework for analyzing macroeconomic phenomena.

2.1 MACROECONOMIC ISSUES

Countries across the world have been faced with different macroeconomic problems over time. Some of this include;-

- a) Achieving and maintaining a high rate of economic growth
- b) Preventing business cycles when symptoms come.
- c) Controlling inflation and stabilizing price levels.
- d) Solving problems of unemployment and poverty reduction.
- e) Containing growing budgetary deficits
- f) And lastly Managing international economic issues

These macroeconomic problems continue to plague most countries and continue to remain a major concern to policy makers. We will discuss briefly the nature and magnitude of these problems.

a) Growth related issues

Achieving and maintaining a high rate of economic growth has been a major concern for most countries across the world. While industrially advanced countries succeed to a great extent in achieving and maintaining a fairly high growth rate (4-8% per annum), developing economies continue to strive for long to achieve a reasonable growth. The main question is why do

some countries grow at a high rate and some countries at low rate while their growth efforts are the same.

There have been a lot of disparities in the question of economic growth while the major problem of the Developed economies is how to sustain the high growth rates that have showed signs of decline developing economies are with the problem of how to accelerate the pace of their economic growth, how to promote investment opportunities among other efforts.

In conclusion achieving and maintaining a sustainable growth rate has for long been and continues to be one of the main macroeconomic issues. The growth related issues are becoming more and more complex as time goes by.

b) The issue of business cycles.

Business cycles refer to high magnitude of fluctuation in the economy i.e. high growth in GDP in one period followed by a sharp decline in the next period. During boom and prosperity there is high rate of growth in GDP and high rate of employment and during Depression there is fast decline in GDP and high rate of unemployment. The recurrent of this type of growth is called business cycles. Economic history of the world economy is in fact the history of business cycles

The forces of business cycles are always present in growing economies and therefore the government and policy makers to be on their guards at the first indication of downslide in the economy hence taking quick action

c) The issue of Inflation.

Inflation is defined as persistent and considerable increase in the price level over a long period of time. A moderate rate of inflation is considered to be desirable for the economy. However the annual inflation rates of most countries have not been in these levels. Excess inflation is economically and socially undesirable and dangerous for the economy.

d) The Issues of Unemployment and Poverty.

Unemployment refers to that part labour force or work force which is willing to work at the prevailing wage rate and is looking for a job but is not able to get employment. The level of unemployment in a country is measured in terms of percentage of out-of-job labour force to total labour

force. Labour force is that part of manpower which is willing to work at the on-going wages and salaries. According to ILO manpower of a country consist of its population in the age-group of 15-65 years. Long term unemployment leads to poverty of the unemployed people. Unemployment and poverty have been a perennial problem in both developing and developed economies but prominently in LDC at different stages of their development.

e) The Issue of Budgetary Deficits

The government budget refers to the annual revenue and expenditure of the government of a country. Budget of late have become a powerful tool of macroeconomic management, control and regulation of the economy, this is what we call **fiscal policy** with the increase in government role and functions, Size of the government budget has grown while at the same time the magnitude of the related. The most important budget related problems are managing budgetary deficits. The problem of persistent budgetary deficit is being faced by both the developed and the developing countries. The reason being government expenditure have been increasing faster than revenue. It is therefore inevitable that most government have been faced with a lot problems in attempting to balance their budgets. Budgetary deficits face both DC and LDC.

f) The International Economic Issue

International trade has been going on since time immemorial. With time however the volume, the pattern, and nature of international transactions have expanded as a result, the world economy is getting globalized very fast, very fast to the extend of becoming a global village. Globalization increased economic interdependence of the countries. With growing interdependence, the economies are being exposed to the risk of getting adversely affected by the changes, especially by inflation, recession and financial instability in trading partners.eg the Dollar depreciation has nearly created global problem, especially for those countries which have accumulated its large reserves. The major economic problems emerging out of this have included the following;-

- i) Growing Balance of Payment Deficits.
- ii) Exchange Rate Fluctuations
- iii) And Excessive Inflow or Outflow of Capital.

To conclude the major macroeconomics issues that macroeconomists and policy makers have to address include

- i) Achieving and maintaining high growth rate
- ii) Preventing Business cycles
- iii) Controlling inflation and stabilizing price level
- iv) Finding a solution to the problems of unemployment and poverty
- v) Managing the growing budgetary deficits
- vi) Managing international issues of;- BOP deficits, Devaluation and appreciation of domestic currency, and inflow and outflow of capital.

Finding solution to these economic problems requires an in-dept, logical and systematic analysis of interrelationship and interaction of the macroeconomic variables. The macroeconomist analyze these issues at both theoretical and empirical levels hence formulating macroeconomic theories. These theories are necessary in the formulation of appropriate economic policies for solving macroeconomic problems of the respective countries.

2.2 SUMMARY OF CONCEPTS USED IN MACROECONOMIC ANALYSIS

It is very essential to acquaint one self with the basic concepts and approaches widely used in macroeconomics.

a) Stock and Flow Variables

Macroeconomic uses certain economic aggregates, called macroeconomic variables, to assess the performance and to analyse the behavior of the economy. These macroeconomic variables are broadly categorized in i) **Stock variable** and

ii) **Flow variables.**

Stock variables

They refer quantity or value of certain economic variables given at appoint in time. i.e. the variables are that are measured with reference to a point in time are stock variables e.g. the stock of capital in a country, the number of persons employed, the total money supply, etc

Flow Variables

These are the variables that are expressed per unit of time e.g. per hour, per week, per month etc. rate of change over time. Examples of flow variables include;- aggregate exports, aggregate investment, savings consumption etc

b) **Equilibrium and Disequilibrium.**

Equilibrium

In economic sense, equilibrium refers to a state or situation on which opposite economic forces are in balance and there is no in-built tendencies to deviate from this position.

Disequilibrium

This is the state in which the opposite forces are in imbalance. The factors causing disequilibrium arise out of the working process of the economy

Partial Equilibrium Analysis

Conceptually partial equilibrium analysis is the analysis of part of the economy, isolated and insulated through assumptions from the influence of changes in the rest of the economy. i.e. when only a part of the economy or economic phenomenon is analyzed in isolation of the rest of the economy, the analysis is partial equilibrium analysis. This concept is widely used in microeconomic analysis.

General Equilibrium Analysis

General equilibrium analysis is carried out where the objective is to analyze the economic system as a whole without using the restrictive assumptions of partial equilibrium analysis. General equilibrium is carried out by taking into the interrelationships and interdependence between the various elements of the economy. It allows all the interrelated factors to vary in reaction to one another and seeks to analyze the simultaneous equilibrium of all the prices and output of all the related goods and it how equilibrium of all related sectors or markets is simultaneously determined. It takes a comprehensive and realistic view of the economic system.

c) **Static, Comparative Static and Dynamic Analysis**

Static Analysis

Static means in a state of rest or in a state of motionless. However it should be noted that the economy is never in the state of rest, therefore making static analysis in economics unrealistic. Although economist create such static economies for the purpose of developing theories

Comparative Static

Comparative statics is a comparative study of economic conditions at two static equilibrium positions at two different points in time.

Dynamic Analysis

In contrast to static approach, dynamic approach is adopted to study an economy in motion. When a macroeconomic phenomenon is analyzed under changing or dynamic conditions, it is called dynamic analysis. In dynamic economy the economic factors and forces keep changing. An economy in motion raises certain issues which cannot be handled through static and even comparative static approaches.

2.3 MACROECONOMIC MODELING

Macroeconomics like any branch of theoretical economics, uses a set of theoretical formulations derived on the basis of some macroeconomic models. Macroeconomist have devised and developed, over time, a set of elegant and remarkable powerful models for the purpose of analyzing the behavior and performance of the economic system as a whole. The economy as a whole is extremely complex system because each and every element and variable of the economy is interrelated, interlinked, interdependent and interactive. To analyze such a complex system systematically and scientifically is an extremely complex and rather impossible task to do.

However in order to study macroeconomic phenomenon macroeconomist divided the entire system under different sectors with common features and characteristics, and developed a simplified model to study the selected macroeconomic phenomenon. This process is called model building. A macroeconomic model or any economic model for that matter, is an abstraction of a macroeconomic phenomenon from the real world, with the

purpose of creating a manageable hypothetical world. The model created is used as a basic tool of analysis to describe, explain and derive the relationship between any two or more macroeconomic variables. Hence macroeconomic model is a representation of the economic phenomenon in terms of a set of behavioral assumptions, definitions, simultaneous equations and identities. Practically the model works as a road map for the purpose of study. It shows the path to be followed to reach the destination.

Steps in the construction of macroeconomic model

- i) Specifying the subject of study and segregating it from the rest of the system
- ii) Specifying and definition of the chosen macroeconomic variables.
- iii) Making assumptions regarding the behavior of selected variables.
- iv) Specifying the relationship between the selected variables in the form of equations, if possible
- v) And lastly specifying the criteria for drawing conclusions.

The choice of relevant economic variables is very important aspect of building economic models. So is the case with macroeconomic models- the choice of relevant macroeconomic variables is essential for building a purposeful macroeconomic model. Macroeconomic variables are generally classified as i) Endogenous variable

ii) Exogenous variable

Endogenous Variables

Endogenous variables are those whose value is determined within the model. Some typical endogenous variables used in macroeconomic models are national income, consumption, savings, investment price level etc.

Exogenous Variables

These are those variables that are determined outside the model. E.g. Money supply, tax rate, government expenditure, exchange rate, etc. however depending on the objective of analysis, endogenous variables are converted into exogenous variables, and exogenous variables can be endogenized.

Take for example Keynes model of income determination. The Keynesian model of income determination assumes that the equilibrium level of income is determined where

$$\text{Aggregate Demand (AD)} = \text{Aggregate Supply (AS)}$$

Aggregate demand and aggregate supply are defined respectively as follows

$$AD = C + I + G + X \quad \text{and}$$

$$AS = C + S + T + M$$

Where C = aggregate consumption, I = Investment spending, G = government spending, X =exports, S = Savings, T = taxes and M = imports

Now, national income equilibrium (Y) can be redefined, respectively as

$$Y = C + I + G + X = C + S + T + M$$

This is the final form of the Keynesian model of determination of the equilibrium level of income. Now lets define macroeconomic variables and specify the relationship between the variables as follows;-

- i) Aggregate consumption (C) may be the function of any variables, like wealth, return on investment, demonstration effect, age factor etc. however Keynes defined aggregate consumption as $C = f(Y)$. This function is based on the assumption that, in the short run, consumption depends on income only, and not on any other factor.
- ii) Variables, I , G , T and X are determined exogenously i.e. these variables are determined outside the framework of the model.
- iii) Although imports of a country depends on a number of factors e.g. price of domestic substitutes of imported goods, foreign price of product, exchange rate etc the Keynesian model assumes that M is the function of income only i.e. $M = f(Y)$

What is important now is to collect the data and test the validity of the model. This is the empirical testing of the model. The model developed is therefore used to make economic generalization and hence formulation of policies.

2.3(a) How Relevant are the Models to the Real World

Economic models are only an approximation of a part of the real world chosen for the purpose of study. The relevance and applicability of this model to the real world will depend on;-

- i) How realistic are the assumptions of the model.
- ii) How consistent are the assumptions with one another.
- iii) How accurate and relevant are the data to validate assumptions
- iv) And How logical and realistic are equations of the model.

CHAPTER THREE

The Circular Flow Models of Economy

3.0 Introduction.

An economy can be defined as an integrated system of production, exchange and consumption. In carrying out these economic activities, people are involved in making transactions- they buy and sell goods and services. Economic transactions generate two kinds of flows;-a) product or real flow i.e. the flow of goods and services and b) Money flow. Product and money flow in opposite directions in circular fashion. The product flow consist of i) The factor flow i.e. the flow of factor services and ii) Goods flow, i.e. flow of goods and services .

In a monetarized economy, the flow of factors of production generates money flows in the form of factor payments which take the form of factor incomes flows. Factor incomes are spent on consumer and capital goods. Which take the form of expenditure flow, Expenditure flow is in the form of money flow. Both product and expenditure flow in circular fashion in opposite directions. The entire economic system can therefore be viewed as a circular flow of factor income. It should be noted that the mechanism of income and expenditure flows is extremely complex in reality. The economist, however, use simplified models to illustrate the circular flows into four sectors

- i) House hold sector. ii) Business sector or the firms iii) Government sector and iv) foreign sector. These four sectors are combined to make the following three models for the purpose of illustrating the circular flows of income and expenditure, and of product and money.
 - a) Two-sector model including the household and business sectors.
 - b) Three-sector model including the household, business, and government sectors
 - c) And Four-sector model including the household, business, government and foreign sectors.

3.1 Circular Flows in a Two-sector Model

The two sector model consists of only households and firm sectors. This model represents a private closed economy in which product and money flows, generated by the government and the foreign sectors are ignored. A two-sector model is obviously an unrealistic model. However, to begin with, a two-sector economy provides a convenient starting point to analyse the

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circular flows. Before we analyze the circular flows, let's look at the basic features and functions of the households and firms

Household

The households are assumed to possess certain specific features;- a) households are the owners of all the factors of production- labour, capital and entrepreneurship, b) their total income consists of returns on their factors of production- wages, rent, interest and profits, c) they are the consumers of all the consumer goods and services, d) they spend their total income on goods and services produced by the firms- if they save any part of their income, it flows to the firms in the form of investment.

Business Firms

The business firms are assumed to have the following features and functions:- a) Firms own no resources of their own, b) they hire the factors of production- land, labour and capital- from the households, c) they use factors of production to produce and sell goods and services to the households; and lastly d) they do not save i.e. there is no corporate saving.

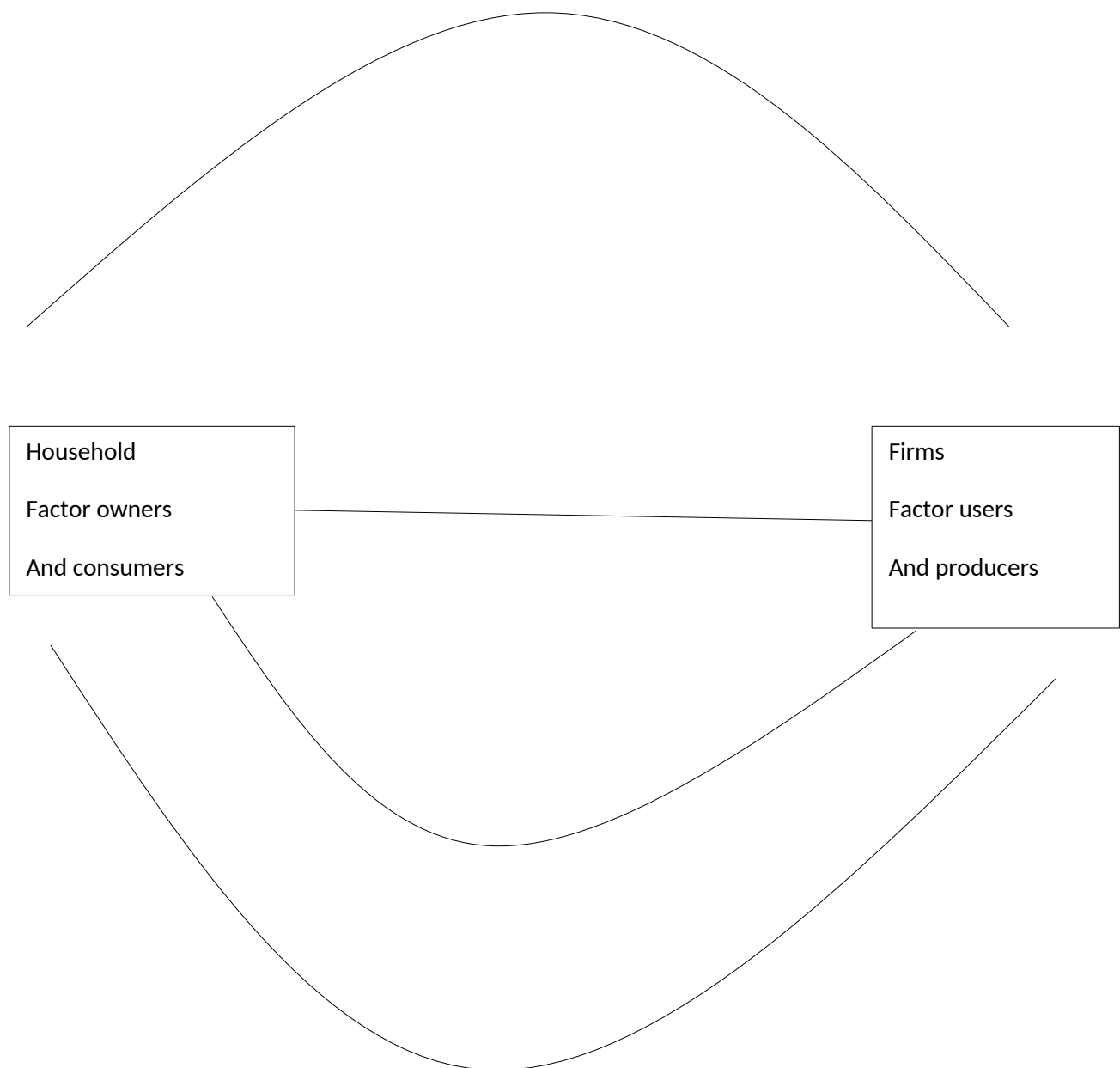
Assumptions of two sector model

The following assumptions are made while specifying the model

- a) Households spend their total income on consumer and capital goods produced by the firms. They do not save any part of their income.
- b) Firms produce goods and services only as much as demanded by the households. They do not maintain any inventory.
- c) Firms make factor payments to the households as rent, wages, interest and profits.
- d) There is no inflow or outflows of income or of goods and services from any outside source.

Let's now describe the circular flows of income and expenditure in a two sector model.

Graphical presentation of circular flow in a two sector model



The household and business sectors are represented by rectangle labeled household and firms respectively with their characteristics. The line drawn from the household to the firm divides the diagram into two parts. The upper half represent the factor market while the lower half represent the goods (commodity) market. Both markets generate two kinds of flows- real or product flows and money flows.

In the factor market the arrow labeled (FOP) shows the flow of factors of production from the households to the firms this represent the real or factor flows indicated by a continuous arrow. This movement causes another reverse flow which is the flow of factor payments (wages, rent and profits) from the firms to the households. Since are factor payments (FP) are made in terms of money, this flow of factor incomes will represent money flows shown by the dashed arrow, it comprises of the total income (Y) of the households. Note that factor services and money flow in opposite directions.

In the commodity market goods and services produced by the firms flow from the firms to the households, this represent the commodity market this creates and opposite movement of payment for the goods and service by the household to the firms, this will represent the money flow. Combining the two flows i.e. the factor market and commodity market we obtain circular flow in a two sector model.

Identities

One important feature with income and expenditure flows is that value are the equal. For example, factor payments are equal to factor incomes and household expenditure equals the value of output. These equalities take the form of identities as shown below;-

$$Y = FP$$

$$FP = w + r + i + p$$

$$W + r + i + p = V = M$$

$$V = Y = M$$

Where Y= household income, FP= factor payments, w= wages, r= rent, i= interest, p= profits, V= value of outputs and M= money flows

In the analysis, household income= factor payments= the money value of output, i.e

$$Y = FP = V$$

This identity is important for national income determination.

Withdrawals, Injections and the size of income flows

The magnitude of income and expenditure flows is determined by the size of the society's income and expenditure: the larger the size of income (or expenditure), the larger the size of flows and vice versa. However in reality there are leakages from and additions into the circular flows of income and expenditure. The leakages and additions are also called withdrawals and injections respectively.

In the two sector model a withdrawal is the amount that is set aside by the households and firms and is not spent on the domestically produced goods and services over a period of time. E.g if household set aside part of their income as a provision for old age or as a provision against loss of job etc and they do not spend it unless required, then this is considered as a withdrawal. It should be noted that all savings are withdrawal in the economy. Note that withdrawals reduce the size of the circular flow.

On the other hand an injection is the amount spent by households and firms in addition to their regular incomes and receipts. An injection by the households is the expenditure that they make in addition to what they receive from the firms as factor incomes e.g. spending inherited savings, own savings or by borrowing and spending.

3.2 Circular flow in a three sector model.

The inclusion of government operations in the above two sector model will lead us to the analysis of the effects of governments fiscal policy (Taxation and expenditure) in the circular flow of incomes therefore leading us to a three sector model.

Taxes are withdrawals from the income flows because they reduce private disposable incomes and therefore consumption expenditure and savings. On the other hand government expenditure is an injection into the income stream. The government expenditure add to the aggregate demand in form of government purchases of factor services from households and goods and services from the business sector. The transfer payments from the

government e.g. Old age pensions, subsidies, unemployment allowance etc. are injections to the circular flows. They sum-up to the household incomes leading to increased household demands for consumer goods.

The three sector circular flow of income and expenditure can be presented as follows. Note that only the money flow to and from the government have been included to reduce overcrowding in the diagram. What should only be remembered is that each money flow has a counter flow in the form of goods flow.

This circular flow is similar to the two sector model only that the magnitude of flow between household and firms is reduced by government in the form of direct and indirect taxes. The government will spend part of this income on wages, salaries and transfer payments to the household and part of it on purchases from the firms and payment of subsidies. Thus the money that flows from household to the government in form of taxes flows back to the economy in the form of government expenditure.

Is the government tax revenue always equal to expenditure?

In the above circular flow it is assumed that government income equals to government expenditure. However in reality this may not be the case, it depends on the government budgetary policy. If the government adopts a *balanced budget policy*, then $G=T$. If the government adopts a *deficit budget policy* then $G > T$ and if the government adopts surplus budget policy then $G < T$. A *deficit budget policy* implies **net injections** into the economy. Therefore this kind of budget policies expand the circular flows. On the contrary a *surplus budget policy* leads to **net withdrawal** from the economy which reduces the size of the circular flows.

3.3 CIRCULAR FLOWS IN A FOUR-SECTOR MODEL (A model with the foreign sector)

The four-sector model is formed by adding the foreign sector into a three sector model. This sector consists of two kinds of international transactions: a) foreign trade i.e. exports and imports of goods and services and b) inflow and outflow of capital. The inter-country transactions make a complex system. The following assumptions are made so as to simplify the model.

- i) The external sector consist of only exports and imports of goods and services
- ii) The exports and imports of goods and non-labour services are made only the firms;
- iii) And that household exports only labour.

It should always be remembered that each money flow has its counterpart commodity flow in the opposite direction. The lower part of the circular flow shows money flows in respect to foreign sector. Exports(X) make goods and services flow out of the country and lead to money (foreign exchange) flow into the country in the form of receipts from exports. This is in fact flow of foreign income into the economy, hence representing *injections* into the economy. Similarly, imports (M) make inflows of goods and services and flow of money (foreign exchange) out of the country. This represents *withdrawal* from the economy.

Another inflow of income is generated by the export of manpower by the households. This brings in foreign remittances in terms of foreign exchange. These inflows and outflows go on continuously so long as there is foreign trade. The magnitude of circular flow in a four-sector will therefore depend

on the trade balance, which is $X-M$ where X represents injections and M represents withdrawals. If $x > m$, it means inflow of foreign income is greater than the outflow of income meaning that there is net injections into the economy arising from foreign trade. The net gain increases the magnitude of circular flows of income and expenditure. Using the same logic, if $x < m$, then there is net withdrawal from the economy hence decreasing the magnitude of circular flows. Also if $x=m$, inflows and outflows of incomes are equal hence leaving the circular flow unaffected.

CHAPTER FOUR

MEASUREMENT OF NATIONAL INCOME

4.0 INTRODUCTION

National income is the single most important variable that represents the economy as a whole. The level of national income determines the level of all other macroeconomic variables- aggregate consumption, savings and investment, employment and the price level. Therefore making the estimation of national income an indispensable exercise. Although the practice of estimating national income had started long ago it only remained as a process of estimating aggregate output. The various concepts of national income accounting were developed by *Simon Kuznets of Harvard University in 1941*. In fact making detailed estimation of national income was thought to be necessary after the publication of Keynes 'the General theory' in 1936. National income accounting or the social accounting is a detailed accounting of the total national product resulting from different kinds of activities, classified under different sectors and industries and also the inter-sectoral flows of goods and services. It also takes into account the net effect of inflows and outflows of goods and services to and from foreign countries.

The importance of national income accounting depends on the fact that the performance and behavior of an economy are studied on the basis of the performance of its macroeconomic variables including national income (estimated as gross national product or gross domestic product), aggregate consumption, aggregate savings and investment, total labor employment, the general price level, total supply of money and total demand for money, and balance of payment (Bop).

4.1 Concepts related to national income

Generally national income is the aggregate money value of all final goods and services resulting from the economic activities of the nationals of a country over a period of time usually one year. Taking this definition one may take compilation of national income to be an easy task, however this may not be the case in reality. There are a number of problems involved this include;- a) the question of what is productive and what is non productive b)

within productive activities what is economic and what is non-economic. C) what should be include in and what should be exclude from the national income and finally d) what method or methods to be used in the measurement of national income. Hence before the discussion of national income compilation it is necessary to look into some of the basic concepts used in national income.

Intermediate and final services

4.2 NATIONAL INCOME MEASUREMENT

Different kinds of national income measurement tools are used in national income analysis and in national income policy formulation. In addition different concepts are used in economic analysis. Some of this concepts and measures of national income include;-

4.2(a) Gross Domestic Product (GDP)

The gross domestic product (GDP) can be defined as the sum of market value of all final goods and services produced in a country during a specific period of time usually one year. It is fundamental to note that in the estimation of GDP the income earned by foreigners in the country are included and the income earned by citizens abroad and remitted to the home country are excluded.

The market value of domestic product is obtained at both constant and current prices. Accordingly GDP is known as GDP at constant prices and GDP at current prices respectively.

The measurement of GDP at market value of all final goods and services is faced with a number of problems. This include:-

- a) Determination of what is final and what is not so as to avoid the problem of double counting.
- b) The evaluation of non-marketed goods and services e.g farm products produced and consumed by farmers themselves and rental value of owner-occupied house

- c) Accounting for incomes from illegal activities and professions e.g smuggling, production and sale of prohibited goods, like narcotics and arms.
- d) Unsold stock and inventories
- e) And finally distortion of prices due to indirect taxes.

However in practice these problems are resolved by the national estimating agency. For instance in Kenya the Kenya national bureau of statistics (KNBS) try to find ways and means to account for these problems.

Alternatively, the GDP can also be defined and measured as the sum of all factor payments (wages, interest, rent, profit and depreciation). It is then called *GDP at factor cost*

4.2(b) Gross National Product (GNP)

The gross national product (GNP) is another measure of national income which often figures in macroeconomic analysis and policy formulations. GNP is similar to GDP though with a significant difference. *GNP includes the income of the residence nationals which they receive abroad, and excludes the incomes generated locally but accruing to the non-national.* Which is actually the opposite of GDP

Comparatively GDP and GNP can be defined as;-

GNP is the market value of domestically produced goods and services *plus* incomes earned citizens of a country in a foreign country *minus* incomes earned by foreigners in the country

GDP can be defined as the market value of goods and services produced by the residents in a country *plus* incomes earned in the country by foreigners *minus* incomes received by residents of a country from abroad.

4.2(c) Net National Product (NNP)

Net National Product (NNP) is GNP minus depreciation. That is;-

$NNP = GNP - \text{Depreciation or capital consumption}$

NNP is the measure of national income which is the measure of national income which is available for for consumption and net investment to the

society. The NNP is in fact, the actual measure of national income. NNP divided by the population of a country gives personal income

4.2(d) Personal Income (PI)

Personal income can be defined as the sum of all kinds of incomes received by the individuals from all sources of incomes. This includes wages and salaries, fees and commissions, bonus, fringe benefits, dividends etc it also include transfer payments eg pensions, family allowances, unemployment allowances etc it also include income earned through illegal means eg Bribes, smuggling, cheating, theft, prostitution etc

Personal income and NNP

It is important to note that the sun of personal income is not exactly the same as NNP this is because NNP excludes certain items included in personal incomes and it includes some other items not included in personal income.

Disposable Income

Disposable income refers to personal income of the income earners against which they do not have any legally enforceable payment obligations. Legally enforceable payment obligations include payment such as income tax, payment due against government loans, fines etc. this can be defined as

Disposable income= personal income-(personal income tax + fees+ fines)

Private Income

Broadly speaking, all personal incomes are private incomes. However, the term private income is used in contrast to public income. For the purpose of national income NNP has been divided into

- a) Private income
- b) And Public income.

Public income is that part of NNP which accrues to the public sector, including administrative units of government and the government commercial undertakings. In contrast, incomes accruing to the individuals, including private sector earnings, transfer payment and

undistributed profits of private companies are known as personal income.

Total private income = Net Domestic Product - Public Income.

Summary of National Income concepts

1. GNP= is the market value of domestically produced goods and services *plus* incomes earned citizens of a country in a foreign country *minus* incomes earned by foreigners in the country
2. GDP= can be defined as the market value of goods and services produced by the residents in a country *plus* incomes earned in the country by foreigners *minus* incomes received by residents of a country from abroad.
3. NNP= GNP - depreciation(capital consumption).
4. PI= NNP-(undistributed company profits+ surplus of public undertakings + Rentals of public property)
5. Disposable income(Y_d)=PI- Personal Taxes

Some Accounting Relationships

1. GNP at factor cost *plus net* indirect taxes *less* depreciation= GNP at market price
2. GNP (at market price) *less* depreciation= NNP at market price
3. NNP at market price *less* indirect taxes *add* subsidies = NNP at factor cost
4. NNP at factor cost *less/add* domestic income accruing to non-residents=NDP at factor cost.
5. NDP at factor cost *less* surplus of public undertakings
Less rental/profits of statutory corporations
Less profit tax
Less income accruing to non residents
Add interest on national debt
Add transfer payments
= personal income.
6. Personal income *less* direct taxes, fees, fines etc

=Disposable income.

4.3 NOMINAL AND REAL GNP.

The GNP and GDP are estimated at both current and constant prices. GNP estimated at current prices is called **Nominal GNP** and GNP estimated at constant prices is called **Real GNP**. Similarly GDP estimated at current prices and constant prices is called Nominal GDP and Real GDP respectively.

The need for estimating GNP or GDP at constant prices arises because GNP at current prices produces a misleading picture of economic performance in inflationary situations.

The GNP Deflator and its Application

This is essentially an adjustment factor used to convert nominal GNP. The GNP deflator is the ratio of price index number (PIN) of the chosen year to the price index number (PIN) of the base year. The PIN of the base year=100. The chosen year is the year whose real GNP is to be estimated. The method of working out GNP deflator is given as;-

GNP Deflator=PIN of the chosen year

100

The formula for converting nominal GNP of a year into real GNP may be written as follows

$$RealGNP = \frac{NominalGNP}{GNPDeflator}$$

Or

$$RealGNP = \frac{NominalGNP}{\frac{PIN_{cy}}{100}} \times PIN$$

Where PIN_{cy} is the price index number of the chosen year

Illustration

Suppose the nominal GNP of a country i.e GNP estimated at current prices in 2000 is given as 500 billion and price index number (PIN) is given as base year 2000=100. Now let the nominal GNP increase to 600 billion in the year 2010 and PIN rises to 110. Find the countries GNP deflator

$$GNPDeflator = \frac{PIN_{2010}}{100} = \frac{110}{100} = 1.1$$

Given the GNP Deflator at 1.10 the Real GNP for the year 2010 can be worked out as follows.

$$RealGnp = \frac{600}{1.1} = sh545.45 \text{ Billion}$$

4.3(b) GNP Implicit Deflator

Another variant of GNP deflator is GNP implicit deflator, also called implicit price deflator. It is the ratio of nominal GNP to real GNP i.e.

$$\text{GNP Implicit Deflator} = \frac{\text{Nominal GNP}}{\text{Real GNP}}$$

The GNP implicit Deflator can be used for the following purposes

- i) To construct price index number
- ii) To measure the rate of change in prices i.e. to measure the rate of inflation or deflation.

From the above illustration we can obtain GNP Implicit Deflator as

$$GNP_{i, plicitDeflator} = \frac{600 \text{ Billion}}{545.45 \text{ Billion}} = 1.10$$

The GNP implicit Deflator gives the **Price Index Number** (PIN) for the year.

$$\begin{aligned} PIN_{2010} &= \text{GNP Implicit Deflator} \times 100 \\ &= 1.10 \times 100 = 110 \end{aligned}$$

Once PINs for different years are calculated, the same can be used to calculate the rate of change in price i.e, the rate of inflation or Deflation. For example the rate of inflation between the year 2000 and 2010 can be worked out as follows

$$\begin{aligned} \text{Rate of Inflation} &= \frac{PIN_{2010} - PIN_{2000}}{PIN_{2000}} \times 100 \\ &= \frac{110 - 100}{100} \times 100 \\ &= 10\% \end{aligned}$$

This means that inflation over a period of 10 years was 10 percent or at an annual average rate of 0.5 percent.

Methods of Measuring National Income

Estimation of national income is an extremely complicated task because the process of income generation in a modern economy extremely complex and therefore, collecting necessary data on sources and levels of income is beset with conceptual and data availability problems. The economist have however come up with different methods of estimating national income. The basic of this is to measure the two kinds of flows generated by the economic activities of the residents of the country. These flows are

- i) The product flows and
- ii) Money flows

From circular flows in relation to money flows it can be seen as either

- a) The money flows as factor payments or
- b) Money flows as payments for goods and services

Out of this two kinds of flows economist have developed the following methods of measuring National income.

- i) Net product method or the Value Added Method
- ii) Factor Income Method,
- iii) And lastly Expenditure Method

Any of the three methods can be utilized to measure national income in a country. In fact all these methods are used to measure GDP which is then adjusted for net income from abroad to arrive at GNP. Let us now look into each one of these approaches.

Net Product Method- The Value Added Method.

The **net product method** which is also called value added approach is comprised of three stage i) estimating the gross value of domestic output in the various branches of production, ii) Determining the cost of material and services used including depreciation, iii) deduction of these costs and depreciation from gross value to obtain the net value of domestic output.

Value Added Method

This is however similar to the product method although this approach is better in that the problem of double counting can be eliminated. In this approach National income is taken to be the money value of all final goods and services produced in a given period of time. The problem of double counting will arise because of the conceptual and practical problem of defining what product is final and what is considered intermediate product. In the production process, some material products pass from one stage to another. But at each stage of production, it is transformed into a final product. However some final product is used as material input at the next stage in the production process of another commodity. Hence caution should be taken so as to eliminate the problem of counting the value of the same product twice, or even more than twice, In estimation of national income. In conclusion the process of computing national income by use of value added approach involves the addition of the value that is added to the initial cost of product at each stage of production.

Form the purpose of estimating value added, the following steps are taken into consideration;-

- a) Identifying the production units and classifying them under different industrial activities
- b) Estimating net value added by each production unit in each production sector
- c) Adding up the total value added of each final product to arrive at GDP.

Factor Income Method

It is also called the factor share method. In this method national income is treated to be equal to all the incomes accruing to the basic factors of production used in producing the national products. Traditionally the factors of production are categorized as;- land, labour, capital and entrepreneurship. Accordingly the national income is treated as the sum of factor payments i.e. rent, wages, interest and depreciation. Thus

National Income (GDP) = Rent + Wages + Interest + profits + Depreciation

In a modern economy it is difficult to distinguish between earnings from land and capital and the earnings from ordinary labour and entrepreneurial efforts. Therefore for the purpose of estimating national income the factors of production are broadly grouped into two categories i.e. labour and capital.

Expenditure Method

The expenditure method, also know as final product method measures national income at the final expenditure stage. In order to estimate the aggregate expenditure, any of the following two methods can be followed;-

- a) *Income Disposal Method* under this approach all money expenditure at market prices are added up together to obtain the total final expenditure.
- b) *Product Disposal Method* under this method the value of the products finally disposed of are computed and added together, this gives a

measure of the total final expenditure and hence, a measure of the national income by expenditure method.

Under the first method, the items of expenditure that are taken into account are i) private consumption expenditure ii) direct tax payments iii) payments made to non-profits institutions and charitable institutions, iv) private savings or investment. Under the product disposal method the following is taken into account i) private consumer goods and services ii) private investment goods iii) public goods and services and iv) net investment abroad.

It should be noted that the Product Disposal Method is commonly used than the income disposal method because of the availability of data.

Treatment of Net income from abroad

It is important to realize that the above methods of measuring national income yields income in a closed economy. In reality, however, most if not all modern economies are open in the sense that they have trade relation or other economic transactions with the rest of the world. In the process some countries make net gains while others make net losses. The net gains and losses are in fact, additions to or deductions from the national income stream. Hence in estimation of national income, net incomes from abroad are added to GDP and net losses are subtracted from GDP to arrive at the national income figure of an open economy. It is important to note that GDP adjusted for net income from abroad is called Gross National Income (GNI)

DOUBLE ENTRY SYSTEM OF ACCOUNTING

Another method that is often used in national income accounting is *Double entry of book keeping method*. National income accounting is a systematic recording of all economic transactions carried out by different sectors of the society and resulting output. Economic transactions involve at least two transactions;- one who pays and one who receives. Note that in the process of earning and spending, each person works as a payer as well as a receiver. He receives money when he sells a product or service and he pays

money when he/she buys a product or service. Therefore each person is allocated an account containing two sides- Credit and Debit side of account. Thus a double entry accounting system is one in which both receipts and payments are recorded- receipts on credit and payments on debit side of the account.

It is important to note that it is not necessary that the account of person balances. A person may spend more than what he receives resulting to a savings which is debited hence resulting to a balanced account or the opposite due to borrowing that is also debited hence balancing the accounts all together. In national income accounting system, the main types of transactions and their accounting include:-

- i) Private consumption
- ii) Government consumption
- iii) Investment (savings converted into capital)
- iv) Government taxes and spending
- v) Inventories
- vi) Net foreign transactions (exports and imports)

These sectoral transactions can be shown as the circular flows of incomes and can be converted into equations. For instance, refer to the circular flows of income in two-sector model.

From the two sector model of circular flows of incomes, the following equations can be derived

$$Y = C + I = C + S$$

Where Y= national income, C= consumption expenditure by household, I= capital spending by Firms, and S= saving by households.

In the three sector model, the national income equation is given as:-

$$Y = C + I + G = C + S + T$$

Where G= government spending, and T= tax revenue of the government.

In a four sector model of the circular flow the equations take the following form:-

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

Where X= exports, and M= imports

Methodology

An economy comprises of a variety of economic activities resulting in different sources and nature of income. For systematic and reliable accounting of national income, it becomes essential to classify different types of income activities and the sources of income. This will provide conceptual clarity and comprehensiveness of the national income estimation. The groups formed from the classification of national income sources is what we call sectors of the economy. This is called sectoral accounting of national income.

Sectoral classification of the economy

For the purpose of estimating national income, the economy can be subdivided into the following sectors.

- i)** Primary Sector
- ii)** Secondary sector, including manufacturing industries
- iii)** And lastly Tertiary sector or service sector, this sector comprises of banking, insurance, transport and communication, trade and commerce.

Depending on the purpose and data availability, these broad sectors of the economy are subdivided under sub- categories. For the purpose of estimating national income, the broad sectors are further divided under sub-sectors that include;-

1) Primary sector

- a)** Agriculture
- b)** Forestry and logging
- c)** Fishing
- d)** Mining and Quarrying

2) Secondary sector

- a)** Manufacturing
- b)** Registered manufacturing
- c)** Unregistered manufacturing

- d) Construction
- e) Electricity, water and gas supply.

3) Tertiary sector

A) Transport, Trade and Communication.

- i) Transport, storage and communication
- ii) Railways
- iii) Other means of transport
- iv) Communication
- v) Trade, Hotels and restaurants

B) Financial and real Estate

- i) Banking and insurance
- ii) Real estate for residential and business purposes

C) Community and personal services

- i) Public administration and Defence
- ii) Other services

Methods of measuring national income

it should be noted at the outset that depending on the nature of the economy, the authorities responsible with national income accounting it may use one single method or a combination of the methods so as to come up with the final figure of the national income.

Given the sectoral and sub-sectoral classification of the economy, lets see how a country can arrive into a national income figure;-

The **production method** or what is called net output method or value added method is used to estimate income or domestic product of the following production process

- i) Agricultural and allied services
- ii) Forestry and logging
- iii) Fishing
- iv) Mining and Quarrying
- v) Registered manufacturing

Income Method is used to estimate domestic income of the following sectors

- i) Unregistered manufacturing
- ii) Gas, electricity and water supply
- iii) Banking and insurance
- iv) Transport, communication and storage
- v) Real estate, ownership of dwelling and business services
- vi) Trade, hotels and restaurants
- vii) Public administration and defence
- viii) Other services

National Product and Related Aggregates

- 1) Gross National Product (at factor cost)
Plus Indirect Taxes
Less subsidies
=Gross National Product at market price
- 2) Gross National Product at market price
Less consumption of fixed capital
=Net National Product
- 3) Net National Product
Less Net Factor Income from abroad
= Net Domestic Product at market price
- 4) Net Domestic Product at market price
Less Indirect Taxes
Add subsidies
= Net Domestic Product at factor cost
- 5) Net Domestic Product at factor cost
Less income from properties and departmental administration enterprises
Less savings of non-departmental enterprises
= Private Sector Domestic Product
- 6) Private Sector Domestic Product
Add National Debt
Add (or Deduct) Net factor income from abroad
Add transfers from administrative departments

Add other Net transfers from the rest of the world
= Private Income

7) Private Income

Less private corporate savings net of retained earnings of foreign companies

Less corporate Income Tax

= Personal Income

8) Personal Income

Less Direct Taxes paid by Households

Less Miscellaneous payments to Government departments
(fees, fines, penalties etc)

= Private Disposable Income

Illustration

CHAPTER FIVE

KEYNESSIAN THEORY OF INCOME DETERMINATION:

Introduction

In the attempts to formulate new theory of employment, Keynes developed the theory of income determination that was in contrast to the classical theory. While the classicalist had emphasized the role of supply, in contrast Keynes emphasized the role of demand in determination of output and employment. In brief he said that the equilibrium level of national income is determined at the level where aggregate demand for goods and services equals their aggregate supply.

We therefore seek to analyze this income determination model in respect to

- i) A simple economy model (or a two sector analysis)
- ii) Closed economy model (or a three sector model)
- iii) Open economy model (or open economy model)

A SIMPLE ECONOMY MODEL

As mentioned early the two sector model consists of only the Household and the business sector. it is important to note that throughout the Keynesian theory of income determination, *prices are assumed to remain constant* even if aggregate demand and supply changes. This is also true for the other two models.

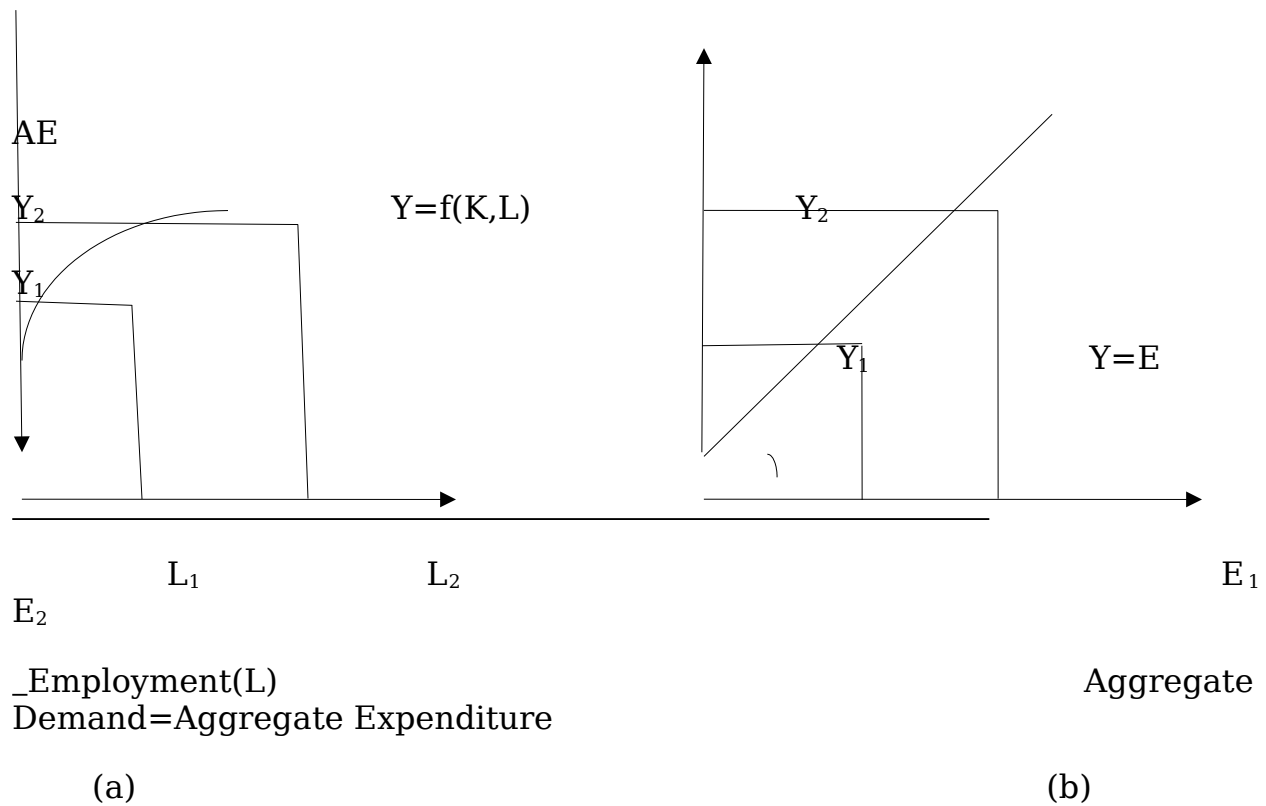
Concepts and functions

Aggregate supply

Aggregate supply refers to the total supply of goods and services in an economy. The derivation of the Keynesian aggregate supply function is illustrated in the figure below. Keynes used the classical production function to derive his aggregate supply function. Recall that classical production function is given as;-

$$Y = f(K,L)$$

Given the production function and technology, the level of real income (Y) depends on the supply and use of productive resources, i.e. Capital (K) and Labour (L). in the short run the stock of capital is fixed. Therefore the short run output depends on the level of employment (L). Therefore the short run production function is given as;-



Derivation of Aggregate supply curve

The production function is represented by graph (a) by the curve $Y=f(K, L)$. as the curve shows, real out put (Y) increases with increase in labour employment though $MP_L = \Delta Y/\Delta L$ goes on decreasing. This relationship between the labour employment and the real output forms the basis of the Keynesian aggregate supply curve.

It can be deduced that the value of real output(Y), measured on Y-axis, equals the aggregate supply price, this, price which producers expect to receive when total output is sold at a given price.

The Aggregate Demand Function in a Two Sector Model

In a two sector model with no government intervention and no foreign trade, aggregate demand (AD) consist of only components;- i) aggregate demand for consumers, goods(C), and aggregate demand for investment goods (I). Thus in a simple economy

$$AD = C + I$$

The value of investment is assumed to be determined exogenously and to remain constant in the short run. The short run aggregate demand function can thus be written as;-

$$AD \equiv C + \bar{I}$$

(Where \bar{I} is constant investment)

The above equation implies that in the short run, AD depends largely on the aggregate consumption expenditure. Meaning that the short run AD function is the function of consumption function plus a constant \bar{I} . this implies that if consumption function is known, the two-sector aggregate demand function can be easily derived, given the constant investment(\bar{I}).

The consumption Function

The consumption functions is one of the most important functions used in macroeconomics and one of the most important functions used in Keynesian theory of income determination. A consumption function is a functional statement of relationship between consumption expenditure and its determinants. Although consumption expenditure of house holds depends on a number of factors- income, wealth, interest rate, future income, life style of society, availability of consumer credit, age, sex among others. Income remains the primary determinant of consumption and savings. Therefore the general form of consumption function can be given as;-

$$C = f(Y), \Delta C/\Delta Y > 0$$

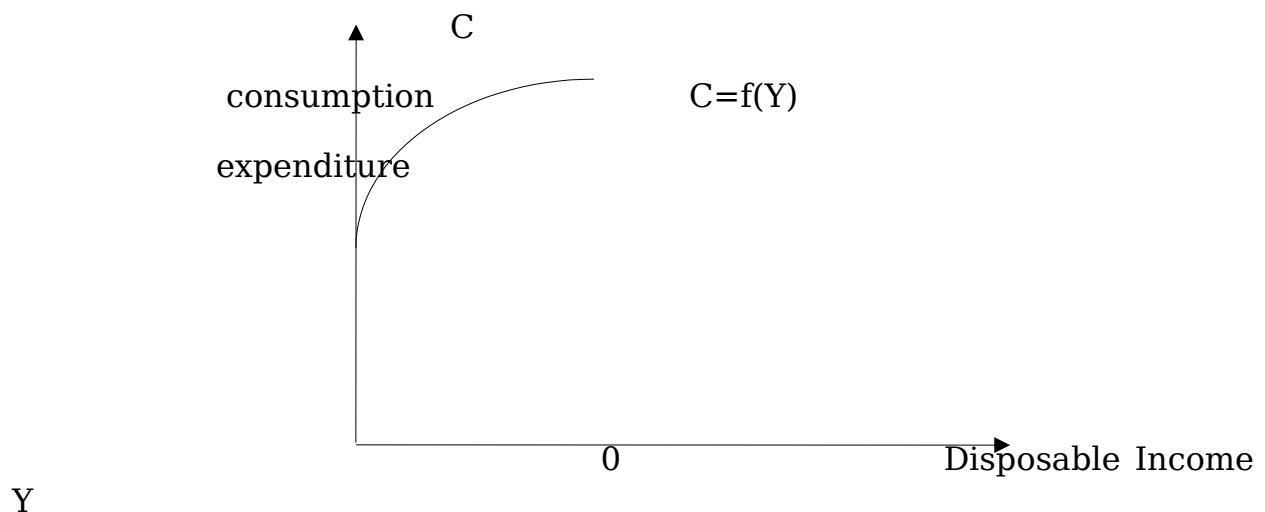
Where C = consumption expenditure, and Y = disposable income

The consumption expenditure is a positive function of income, i.e consumption increases with increase in income. According to Keynes, this relationship between income and consumption is based on a fundamental psychological law that men are disposed as a rule and on average, to increase their consumption as their income increase, but not as much as the increase in their income i.e, $\Delta C/\Delta Y$ goes on decreasing in the case of individual households, These therefore posses the question of

proportionality in the increase in consumption expenditure and income which is analyzed by use of the **marginal propensity to consume** concept.

Marginal Propensity to Consume (MPC)

Marginal Propensity to Consume (MPC) refers to the relationship between marginal income and marginal consumption. This is also expressed symbolically as $\Delta C/\Delta Y$. According to Keynes;- as income increases people tend to consume a decreasing proportion of the marginal income. This represent the Keynesian consumption function. This produces a non-linear consumption function as shown below



It is important to note that the Keynesian consumption function is relevant for individual consumption behavior – not for the economy as a whole or at the aggregate level.

The Linear Aggregate Consumption Function

Although Keynes postulated a non-linear consumption function, it has now become a convention in the modern interpretation and analysis of Keynesian macroeconomics to use a linear aggregate consumption function of the following form

$$C = a + bY$$

Where C = aggregate consumption expenditure, Y = Total disposable income, a is the intercept term which is a positive constant, it denotes the level of consumption at zero level of income (autonomous consumption), b is a positive. Mathematically, it represents the slope of a linear consumption function. It denotes a constant $MPC = \Delta C / \Delta Y$. the MPC is less than unity but greater than zero, that is $0 < b < 1$

Given the function it can be shown that $b = \Delta C / \Delta Y$

If $C = a + bY$

then $C + \Delta C = a + b(Y + \Delta Y)$

$$\Delta C = -C + a + bY + b\Delta Y$$

Since $C = a + bY$, the terms $(-C)$ and $(a+bY)$ cancel out. Then

$$\Delta C = b\Delta Y, \text{ then}$$

$$\Delta C / \Delta Y = b$$

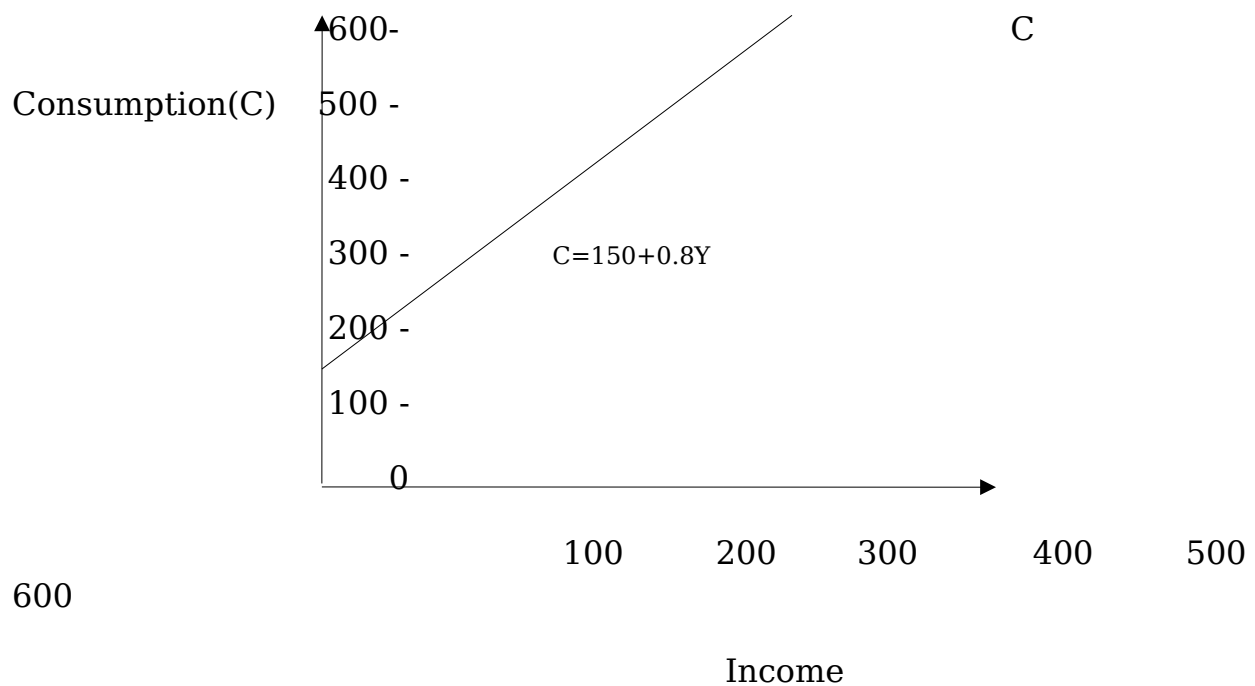
Graphical Presentation

Let us suppose that an empirically estimated linear aggregate consumption function is given as:-

$$C = 150 + 0.8Y$$

The consumption function can be presented graphically as shown below. Where consumption amounting to 150 is consumed even when incomes equals to zero. Also it can be interpreted that subsequent increases in income (ΔY s) induces additional consumption (ΔC s) at a fixed proportion of 80% of the marginal income

The linear Aggregate Consumption Function



For example, when aggregate income increases from sh 200 to sh 300, aggregate consumption increases from sh 310 to sh 390

Proof

$$\Delta Y = 300 - 200 = 100$$

$$\Delta C = 390 - 310 = 80$$

Therefore

$$\Delta C / \Delta Y = 80 / 100 = 0.8 \text{ (or 80\%)}$$

Average Propensity to Consume (APC)

The average propensity to consume (APC) is defined as

$$APC = \frac{C}{Y}$$

Given the consumption function, $C = a + bY$,

$$APC = \frac{a+bY}{Y}$$

If consumption function is assumed to be of the form $C = bY$, then,

$$APC = \frac{bY}{Y} = b$$

It implies that if $C = bY$, then $APC = MPC$

Savings Function

The savings function is the counterpart of the consumption function. It states the relationship between income and savings. Therefore, savings is also the function of disposable income. i.e

$$S = f(Y)$$

We know that $Y = C + S$. thus, consumption and savings functions are counterparts of one another. Therefore if one of the functions is known, the other can be easily derived. Given the consumption function as $C = a + bY$, saving function can easily be derived as follows. Since,

$$Y = C + S, \text{ savings can be defined as}$$

$$S = Y - C$$

By substituting consumption function, $C = a + bY$, for C in the above equation, we obtain

$$S = Y - (a + bY)$$

$$= -a + (1-b)Y$$

The term $1-b$ in function gives the marginal propensity to save (MPS), where $b = MPC = \Delta C / \Delta Y$.

The savings function can be derived algebraically as follows.

By substituting consumption function, $C = 150 + 0.8Y$ for C we get the savings function as

$$S = Y - (150 + 0.8Y)$$

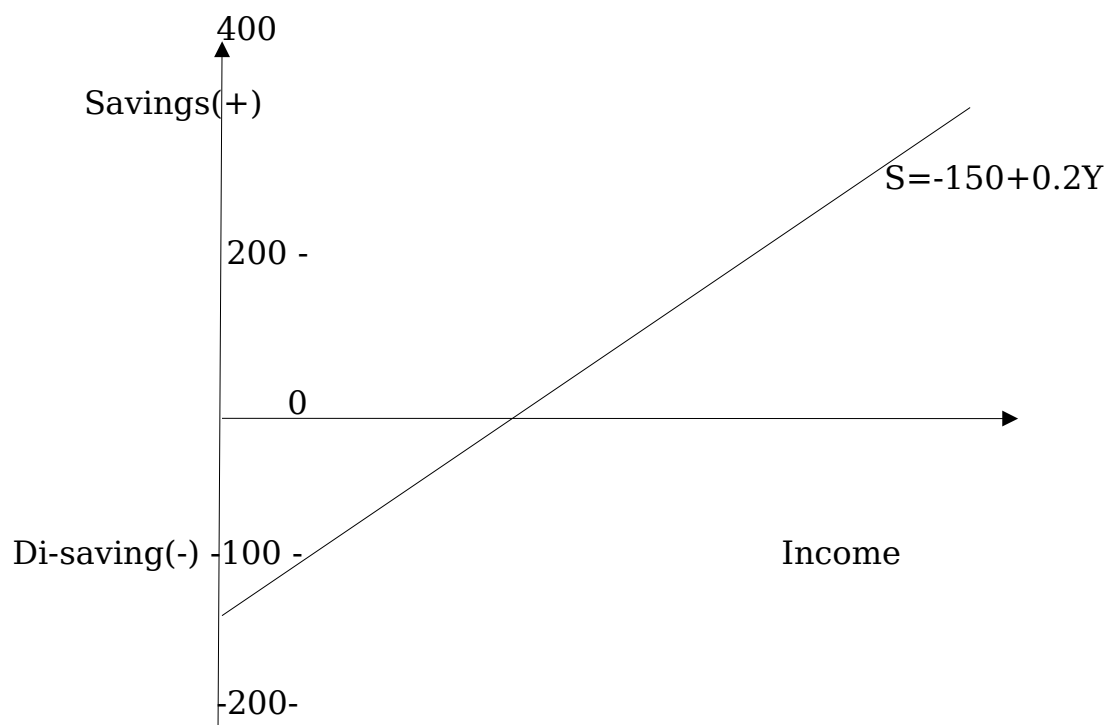
$$= Y - 150 - 0.8Y$$

$$= -150 + (1 - 0.8)Y$$

$$S = -150 + 0.2Y$$

This can be represented graphically as shown below.

Illustration of the savings function



Aggregate Demand Function

After the explanation of the savings and consumption functions we, can therefore look into the aggregate demand function, assuming that investment (I) remains constant. Recall aggregate demand (AD) and consumption (C) functions given as

$$AD = C + I$$

$$C = a + bY$$

By substituting $a + bY$ for C , we get

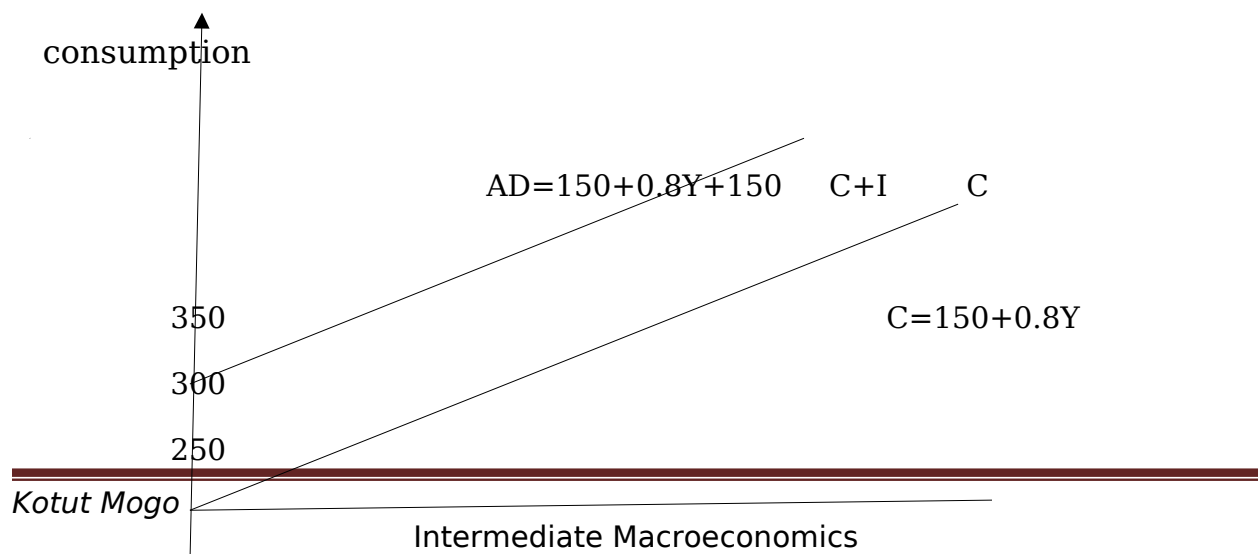
$$AD = a + bY + I$$

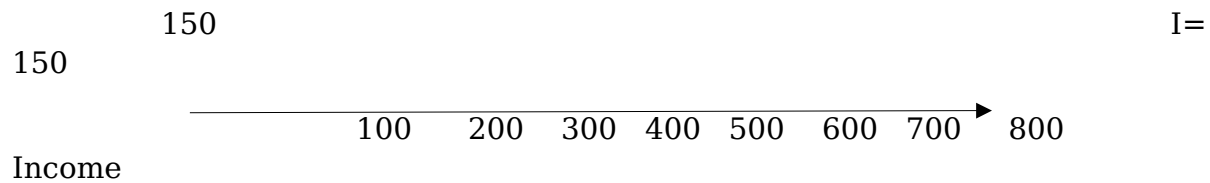
Recall our estimated hypothetical consumption function $C = 150 + 0.8Y$ and assume that $I = 150$. By substitution, the estimated aggregate demand function can be written as

$$AD = 150 + 0.8Y + 150$$

The derivation of the aggregate demand function is shown in the figure below. Where constant investment is shown by straight horizontal line, $I = 150$. Consumption (C) being a rising function of income is shown by a upward sloping line, $C = 150 + 0.8Y$. The aggregate demand function is obtained by vertical summation of the consumption and the constant investment, that is

$AD = C + I$, at different levels of income (Y)





The Aggregate Demand Function

Income Determination in Simple Economy Model

A simple economy model is a two sector model i.e. household and business sector. However and economy of this kind does not exist in reality, But this hypothetical economy provides a simple and a very convenient starting point in understanding the Keynesian theory of income determination.

Specification of the model

Assumptions

The simple economy model makes the following assumptions.

- i) There are only two sectors in an economy, Vis the household and the business sectors- there is no government and foreign sectors of the economy.
- ii) Aggregate demand consist of i) aggregate consumer demand(C), and Aggregate investment demand (I). Thus, aggregate demand (AD) equals $C + I$. there is no leakage or injection.
- iii) Since there is no government sector there is no tax and no government expenditure
- iv) It is a closed economy i.e. no foreign sector
- v) In the business sector there is no corporate savings or retained earnings
- vi) All prices including factor prices remain constant
- vii) The supply of capital and technology is given

Income and Output Determination

According to the Keynesian theory of income determination, the equilibrium level of national income is determined at a level where the aggregate demand ($C + I$) equals the aggregate supply of income $Y = C + S$, that is the National income equilibrium is determined at a level where;-

Aggregate Demand = Aggregate Supply

$$AD = AS$$

$$C + I = C + S$$

Formal model of Income Determination

Recall that according to the Keynesian theory of income determination that the equilibrium level of national output is determined where aggregate demand (C + I) equals the aggregate supply (C + S). From above $AD = AS$

$$C + I = C + S \dots\dots\dots$$

(5)

Since C common to both sides of the above equations, C on both sides gets canceled out. Thus, the equilibrium condition for the national income can also be expressed as

$$I = S \dots\dots\dots(6)$$

Given the above equations there can be two approaches to explain the Keynesian theory of national income determination i.e.

- i) AD = AS approach and
- ii) S-I approach.

AD-AS Approach According to the AD-AS Approach, national income equilibrium is determined where

$$C + I = C + S$$

Equation (5) gives the equilibrium level of national in

$$Y = C + I \dots\dots\dots(7)$$

We have assumed above that $C = a + bY$ and I is constant at I. By substituting $a + bY$ for C and I for I in equation (7) the equilibrium level of national income can be expressed as

$$Y = a + bY + I \dots\dots\dots(8)$$

The above equation (8) may be solved to find the equilibrium level of national income (Y) and consumption (C) lets solve first for Y

$$Y = a + bY + I$$

$$Y - bY = a + I$$

$$Y(1-b) = a + I$$

$$Y = \frac{a+I}{1-b}$$

$$Y = \frac{1}{1-b}(a+I) \dots\dots\dots(19)$$

Determination of consumption having obtained the equilibrium level of Y, that is the total personal income in our two-sector model, we can work out the equilibrium level of consumption as follows. Given the consumption function as

$$C = a + bY$$

Substituting equation (9) for Y in the consumption function, we get

$$C = a + b\left[\frac{1}{1-b}\right](a+I)$$

$$C = a + \frac{b}{1-b}(a+I)$$

.....20

Illustration

The equilibrium level of Y and C can be determined numerically by assuming a hypothetical consumption function and a given level of I. suppose consumption function is given as:

$$C = 150 + 0.8Y$$

$$I = 200$$

There are two approaches to finding the equilibrium level of C

- i) Substitute the numerical value for a, b and I in equation (20)
- ii) First calculate equilibrium Y and find the value of C in the question

Solution

i) Substitution

$$\begin{aligned} C &= 150 + \frac{0.8}{1-0.8}(150+200) \\ &= 150 + 4(350) \\ &= 1550 \end{aligned}$$

Calculation by numerical values for C and I

$$\begin{aligned}Y &= 150 + 0.8Y + 200 \\Y(1 - 0.8) &= 150 + 200 \\Y &= \frac{1}{1-0.8}(350) \\Y &= 1750\end{aligned}$$

Therefore given the consumption function as $C = 150 + 0.8Y$ and $I = 200$ the equilibrium level of income is determined at 1750, hence consumption will be determined by substituting 1750 for Y in the consumption function. Thus

$$\begin{aligned}C &= 150 + 0.8(1750) \\&= 1550\end{aligned}$$

Since we have obtained the values of Y and C , we can easily obtain the equilibrium level of savings (S)

$$S = Y - C$$

Substituting

$$\begin{aligned}S &= 1750 - 1550 \\&= 200\end{aligned}$$

Equilibrium in the two sector model will be

Aggregate Demand = Aggregate Supply = National Income

$$C + I = C + S = Y$$

$$1550 + 200 = 1550 + 200 = 1750$$

The savings- investment approach to income determination the equilibrium level of income can be determined by using only S and I schedules. This is called the saving-investment approach. It can be derived directly from the national income equilibrium condition based on AD-AS approach. We know that, at equilibrium, $AD=AS$, i.e. where

$$C+I = C + S$$

Since C is common to both sides of this equation, it gets cancelled out. Then, the equilibrium condition can be written as

$$I = S \quad \dots\dots\dots (25)$$

Investment (I) is assumed to remain constant at I. but savings is the function of income, i.e, $S = f(Y)$. deriving the saving function;- we know that

$$S = Y - C \quad \dots\dots\dots (26)$$

and $C = a + bY$

Substituting C in equation (26) we obtain

$$S = Y - (a + bY)$$

$$S = Y - a - bY$$

$$S = -a + Y - bY$$

$$S = -a + (1 - b)Y$$

Hence given the saving function, the equilibrium condition by saving-Investment approach can be written as:

$$I = -a + (1 - b)Y$$

From our example in eq21

$$S = -150 + (1 - 0.8)Y$$

Assuming constant investment at 200, Then substituting for the values of Y we obtain

$$200 = -150 + (1 - 0.8)Y$$

$$350 = (1 - 0.8)Y$$

$$Y = \frac{350}{1 - 0.8} = 1750$$

Graphically

The change in aggregate demand and Multiplier

Change in Demand

It can be seen that a change in aggregate spending will shift the equilibrium from one point to another and a shift in the equilibrium will reflect change in the level of national income. An increase in aggregate spending makes the aggregate demand schedule shift upwards as a result AS shifts upward. This is only a directional approach the question is there a relationship between change in aggregates demand and change in the national income if Yes then what determines this relationship and magnitude of change in national income. The answer is provided by the **Multiplier**.

Change in investment and Multiplier

In two sector model, a change in aggregate demand may be caused by a change in consumption expenditure, or a change in business investment, or change in both. Consumption expenditure is however a more stable function of income. Therefore, consumption spending changes only with change in income. But when an economy is in equilibrium, income level is fixed and, therefore, consumption level is also fixed.

Investment is determined exogenously by such factors as expansion in business prospects, innovation and invention of new products, fall in interest etc lets Assume a change in demand function due to change in business investment.

The diagram below illustrates an upward shift in the investment schedule from I to $I + \Delta I$, causing an upward shift in the aggregate demand schedule from $C + I$ to $C + I + \Delta I$. The increase in investment may be the result of an autonomous investment.

When investment increases from I to ΔI as shown by upward shift in the I-schedule, it causes an upward shift in the aggregate demand schedule from $C+I$ to $C+I+\Delta I$. due to upward shift in the aggregate demand schedule, the equilibrium point shifts from point E_1 to E_2 and as a result, national income increases from OY_1 to OY_2

The increase in national income (ΔY) can be obtained as

$$\Delta Y = Y_2 - Y_1 = Y_1 Y_2$$

This increase in income (ΔY) is the result of ΔI . It can be seen that $\Delta Y > \Delta I$. This point can be provide as follows. Note that $\Delta Y = E_1 M$ and since points E_1 and E_2 are

both on the 45° line, $E_1M = E_2M$. Note also that $\Delta I = E_2K$ and $E_2M > JK$ and that $E_2K > JK$. It proves that $\Delta Y > \Delta I$. It means that when ΔI takes place, the resulting ΔY is some multiple of ΔI this multiple (m) can be obtained as

$$m = \frac{\Delta Y}{\Delta I}$$

Where M is the investment multiplier. Since $m\Delta Y > \Delta I$, multiplier m is greater than 1. This implies that when investment increases in an economy, national income increases by more than the increase in investment.

Simple investment multiplier model

The following model presents the algebraic method of working out the investment multiplier. Recall that the equilibrium level of income is given as

$$Y = C + I \quad \dots\dots\dots(28)$$

Let investment increase by ΔI . when ΔI takes place it results in ΔY and ΔY induces ΔC . this therefore gives;-

$$Y + \Delta Y = C + \Delta C + I + \Delta I \quad \dots\dots\dots(29)$$

Subtracting e.q. (28) from 29 we obtain

$$\Delta Y = \Delta C + \Delta I \quad \dots\dots\dots(30)$$

Given the consumption function as

$$C = a + bY$$

$$C + \Delta C = a + bY + b\Delta Y$$

Therefore

$$\Delta C = b\Delta Y \quad \dots\dots\dots(31)$$

Substitute 31 for ΔC in 30

$$\Delta Y = b\Delta Y + \Delta I \quad \dots\dots\dots(32)$$

$$\Delta Y(1-b) = \Delta I \quad \dots\dots\dots(33)$$

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

$$\frac{\Delta Y}{\Delta I} = \frac{1}{1-b} = m$$

Thus the term $\frac{1}{1-b}$ gives the value of the investment multiplier

Recall that in eq. 33 $b = \text{MPC}$ and $1 - \text{MPC} = \text{MPS}$. Therefore, multiplier (m) can also be expressed as:

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

The last term in this equation indicates m as the reciprocal of MPS

Alternative method of working out multiplier

The multiplier can be worked out by using the expanded form of the aggregate demand equations at the points of national income equilibrium before and after ΔI takes place.

$$Y_1 = C + I$$

Since; $C = a + bY$

The pre- ΔI equilibrium level of income (Y_1) may be written as:

$$(35) \quad Y_1 = a + bY_1 + I \quad \dots\dots\dots$$

$$= \frac{1}{1-b}(a+I)$$

Similarly, at post ΔI equilibrium point E_2 is

$$\begin{aligned} Y_2 &= C + I + \Delta I \\ &= a + bY_2 + I + \Delta I \\ &= \frac{1}{1-b}(a + I + \Delta I) \end{aligned} \quad \dots\dots\dots(36)$$

Subtracting 35 from 36 we obtain

$$\Delta Y = \frac{1}{1-b}(a+I+\Delta I) - \frac{1}{1-b}(a+I)$$

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

(37)

Equation 37 gives the relationship between ΔY and ΔI , that is ΔY equals $1/(1-b)$ multiplied by ΔI . therefore, $1/(1-b)$ is the investment multiplier. Thus,

$$\text{investment multiplier}(m) = \frac{1}{1-b}$$

Numerical Example of the Multiplier Model

Recall the two sector model of income determination

$$C = 150 + 0.8Y$$

$$I = 200$$

Given this model, the pre- ΔI equilibrium level of income (Y_1) may be expressed as

$$\begin{aligned} Y_1 &= C + I \\ &= 150 + 0.8Y_1 + 200 \\ &= \frac{1}{1-0.8}(150+200) \\ &= \frac{1}{0.2}(350) \\ &= 1750 \end{aligned}$$

Suppose exogenous investment increases by 100. The total investment may be expressed as

$$I + \Delta I = 200 + 100$$

The post ΔI equilibrium level of income can now be expressed as:

$$Y_2 = 150 + 0.8Y_2 + 200 + 100$$

$$= \frac{1}{1-0.8} (150+200+100)$$

$$= \frac{1}{0.2} (450)$$

By subtracting

$$\Delta Y = Y_2 - Y_1$$

$$\frac{1}{0.2} (450) - \frac{1}{0.2} (350)$$

$$\frac{1}{0.2} (100) = 500$$

Since $\Delta Y = 500$ and $\Delta I = 100$

$$m = \frac{\Delta Y}{\Delta I} = \frac{500}{100} = 5$$

It may now be concluded that if $MPC = 0.8$, the investment multiplier equals to 5. It implies that if $M = 5$, then any additional investment will generate an additional income equal to five times of ΔI , all other things remaining the same.

What determines the value of multiplier?

The numerical value of the multiplier is determined by numerical value of MPC . This is evident from the multiplier formulae given in Equation reproduced below

$$m = \frac{1}{1 - MPC}$$

The uses and limitations of Multiplier

Uses of Multiplier

The concept of multiplier is important in macroeconomic planning and projects and in the assessment of possible effects of the changes made in the fiscal policy of the government. In the two sector model its role is limited to:-

- i) The assessment of the overall possible increase in the national income due to one shot increase in investment or due to a single injection of investment
- ii) To plan economic growth of the country.

Illustration.

Suppose a country has an income of Sh 100billion and its MPC is 0.8(or 80%). The level of multiplier for the country will be 5. Also suppose the country wants to double its national income over a period of time through a one shot investment. That is it wants to increase its national income by $\Delta Y = 100$ million

The investment requirement for the two sector country can be worked as

$$\text{Planned growth}(\Delta Y) = \text{Sh } 100$$

$$\text{Multiplier}(m) = 5$$

$$\text{Investment Requirement } (\Delta I) = \Delta Y/m$$

$$= 100/5$$

$$= \text{Sh } 20 \text{ billion}$$

It therefore means that increasing national income by 100 million requires an increase of 20 billion in investment.

Limitations of Multiplier

The following are the limitations to the theory of Multiplier

i) Leakages from the income stream

The multiplier theory assumes that those who earn income as a result of certain autonomous investment would continue to spend a certain (constant) percent of additional income, depending on aggregate MPC. In reality however this assumption does not work because people tend to spend their additional income on many other non consumption and non-investment item.

Such expenses are leakages from the income stream. The leakages reduce the value of multiplier. Some of these leakages include

a) Payment of the past debts

b) Purchase of existing wealth

c) Importation of goods and services

ii) Non-availability of consumer Goods and Services

Lack of adequate and instant supply of goods and services also limits the proper working of the multiplier concepts. During the lag period then newly earned income creates additional demand for goods and services which builds demand pressure, In return prices of consumer goods increases, thus leading to inflationary tendencies in the economy. Inflation eats away consumption expenditure therefore translating to reduction in the multiplier effect in the economy.

iii) Full employment situation

The multiplier principle does not work in case of full employment situation. When the resources of the country are fully employed or near full employment, increasing production would not be possible. Hence additional investment will lead to inflation which in the long run is harmful to the economy in question.

B) INCOME DETERMINATION IN A CLOSED ECONOMY MODEL.

(Three sector model)

This section explains income determination in a three sector model, this sector are Household, Firm and Government sector. This model is build by incorporating the government sector into the two sector model. The government influences the level of economic activities in a various activities, however the closed economy model of Keynesian income determination theory confines to the effects of government expenditure (including transfer payments) and taxation. Thus inclusion of the government sector into the simple economy model introduces three new variables to the model i.e. Taxes (T), government expenditure (G), and transfer payments (G_t). The entire process of taxation, government spending and transfer payments is a complex procedure, however we assume a simplified system, where the government makes the following fiscal operations;-

- i) It imposes only direct taxes to the household
- ii) It spends money on buying factor services from the household sector and goods and services from the private firms
- iii) It makes transfer payments in terms of pensions and subsidies.

Income determination with Government spending and Tax: Model I

Model I is an extension of the two sector model put includes additional variables i.e. government *on purchases and* government income tax,

Assumptions of the model

- i) There is no transfer payments
- ii) There is only one form of tax i.e. lump sum income tax that is determined exogenously
- iii) The government spending is also exogenously determined.
- iv) The government follows a balanced budget

AD-AS Approach

Under AD-AS approach, the variables of the aggregate demand (AD) and aggregate supply (AS) of the three sector model can be specified as

$$AD = C + I + G$$

$$AS = C + I + T$$

The Keynesian condition for equilibrium of national income may be presented as;-

$$C + I + G = C + I + T$$

Hence at equilibrium,

$$Y = C + I + G \quad \dots\dots\dots(4)$$

In a three sector model variable C in Eq. 4 needs to be redefined. With tax imposition, consumption function (C) is redefined as

$$C = a + bY_d$$

Where $Y_d = Y - T$ (Disposable income)

Where T = Tax (lump sum tax)

Substituting $Y - T$ from Y_d consumption function in a three sector model can be written as

$$C = a + b(Y - T) \quad \dots\dots\dots(5)$$

Substituting Eq. 5 for C in 4

$$Y = a + b(Y - T) + I + G \quad \dots\dots\dots(6)$$

Rearranging

$$Y = a + bY - bT + I + G$$

$$Y(1-b) = a - bT + I + G$$

$$\boxed{Y = \frac{1}{1-b}(a - bT + I + G)} \quad \dots\dots\dots(7)$$

This represents the formal model for equilibrium of national income in a three sector model

When the values of I, G and T are known then the equilibrium income can be computed easily.

Illustration

Recall our earlier illustration of the two sector model

$$C = 150 + 0.8Y$$

$$I = 200$$

Assume the government has a balanced budget of

$$G = T = 100$$

Find the equilibrium level of income for this economy.

Given that $Y = (a + bY + I + G)$

$$\begin{aligned} Y &= \frac{1}{1-0.8} \{ 150 - (0.8 \times 100) + 200 + 100 \} \\ &= \frac{1}{0.2} (150 - 80 + 200 + 100) \\ &= 5(370) \\ \therefore Y &= 1850 \end{aligned}$$

(ii) saving- investment Approach with G and T

Income Determination with Transfer Payments:- *model two*

Model II this is an extension of model I with additions of transfer payments to the model. A transfer payment is opposite to Tax and it can be treated as negative tax. Transfer payments enhances household spending capacity, hence having a positive effect on the equilibrium level of income. Transfer payments can either be autonomous or can be financed from tax payments. We will only deal with autonomous transfer payments in this level.

The model remains the same i.e. $Y = C + I + G$. however the inclusion of transfer payments in the model, holding other factors constant, alters the consumption, function from

$$C = a + b(Y - T)$$

To $C = a + b(Y - T + G_t)$

(Where G_t is autonomous transfer payment)

Now recall Eq 7

$$Y = \frac{1}{1-b} \{a - bT + I + G\}$$

Incorporating transfer payment (G_t)

$$Y = \frac{1}{1-b} \{a - b(T - G_t) + I + G\}$$

$$Y = \frac{1}{1-b} \{a - bT + bG_t + I + G\}$$

In this equation the term bG_t is the increase in consumption caused by G_t . when the value of G_t is known, the equilibrium level of the national income could be computed

Illustration

From our illustration the equilibrium level of income was

$$\begin{aligned} Y &= 150 + 0.8(Y - 100) + 200 + 100 \\ &= 1850 \end{aligned}$$

Assuming that $G_t = 50$ and that an increase in consumption caused by G_t equals $0.75(50)$. The effect of the transfer payments on the equilibrium level of the national income can be obtained by inserting G_t in the above equation

$$\begin{aligned} Y &= 150 + 0.8(Y - 100 + 50) + 200 + 100 \\ Y(1 - 0.8) &= 150 - 80 + 40 + 200 + 100 = 410 \\ Y &= \frac{1}{0.2}(410) \\ &= 2050 \end{aligned}$$

Income determination with Tax as a function of income;- Model III

In the past analysis we have assumed a constant exogenous lump sum tax, however this assumption is not realistic it is only useful for the development of theories. In this model we assume a tax function rather than the lump sum tax. For the purpose of study we assume a constant autonomous tax (T) and a proportional income tax

rate, expressed as tY . A proportional income tax is, by implication a function of income.

$$Y = a + b(Y - \bar{T} - tY) + I + G$$

$$\rightarrow a + bY - b\bar{T} - btY + I + G$$

$$Y - bY + btY = a - b\bar{T} + I + G$$

$$Y(1 - b + bt) = a - b\bar{T} + I + G$$

$$Y = \frac{1}{1 - b + bt} (a - b\bar{T} + I + G)$$

OR

$$Y = \frac{1}{1 - b(1 - t)} (a - b\bar{T} + I + G)$$

The term $\frac{1}{1 - b(1 - t)}$ in the above equation is the **Tax multiplier**.

Illustration

Suppose the structural equations of a given economy are given as:-

$$C = 150 + 0.8(Y - T)$$

$$I = 200$$

$$T = 25 + 0.1Y$$

$$G = 100$$

The equilibrium level of income will be

$$Y = 150 + 0.8(Y - 25 - 0.1Y) + 200 + 100$$

$$= \frac{1}{1 - 0.8 + 0.08} (430)$$

$$= 1535.71$$

Income Determination with Tax Function, Government Expenditure and Transfer payments

Model IV.

Extending model III to include transfer payments (G_t) and analyse its effect on the equilibrium level income,

Assume that all the parameters of model IV are the same as Model III and that transfer payments (G_t)=50, with inclusion of transfer payments (G_t) consumption function can be written as

$$C = a + b(Y - T - tY + G_t)$$

Substituting to Eq. 31

$$\begin{aligned} Y &= a + b(Y - T - tY + G_t) + I + G \\ &= a + bY - bT - btY + bG_t + I + G \\ Y &= \frac{1}{1 - b(1 - t)} (a - bT + bG_t + I + G) \end{aligned}$$

Substituting parametric values

$$\begin{aligned} Y &= \frac{1}{1 - 0.8(1 - 0.1)} \{150 - 0.8(25) + 0.8(50) + 200 + 100\} \\ &= \frac{1}{0.28} \{150 - 20 + 40 + 200 + 100\} \\ &= \frac{1}{0.28} \{470\} \\ &= 1678.57 \end{aligned}$$

The Fiscal Multipliers

This section discusses in brief the multipliers associated with government's fiscal operations, for this study we will consider

- i) Government expenditure
- ii) Taxation of incomes

The Government Expenditure Multiplier:- the G-Multiplier

Assumptions

Kotut Mogo

Intermediate Macroeconomics

- a) That the government spends its money on goods and services alone.
There is no transfer expenditure
- b) That I, G and T are constant and
- c) Consumption function is given

Recall the three sector equilibrium

$$Y = \frac{1}{1-b} \{a - bT + I + G\} \dots\dots\dots(34)$$

Suppose government expenditure increases by ΔG , all other factors given. This (ΔG) causes an increase in the aggregate demand and therefore a rise in the equilibrium level of income by, say, ΔY . The equilibrium level of national income with ΔG can be expressed by modifying the above Equation and get the following

$$Y + \Delta Y = \frac{1}{1-b} \{a - bT + I + G + \Delta G\} \dots\dots\dots(35)$$

Subtracting 34b from 35 we get ΔY resulting from ΔG

$$\Delta Y = \frac{1}{1-b} (\Delta G) \dots\dots\dots(36)$$

Therefore the government expenditure Multiplier (G_m) can be obtained as

$$G_m = \frac{\Delta Y}{\Delta G} = \frac{1}{1-b}$$

The Tax Multiplier:- T-Multiplier

A tax is a withdrawal from the circular flow of income. Therefore a tax has a negative effect on the equilibrium level of income. Tax multiplier refers to the negative multiple effect of the change in tax on the national income.

Increase in Lump-Sum tax and Tax Multiplier

Introduce ΔT into the equilibrium equation. Recall national income equilibrium equation with a given Lump-sum tax (T)

$$Y = \frac{1}{1-b} \{a - bT + I + G\} \dots\dots\dots(38)$$

Introduce the ΔT . a change in tax changes the national income by ΔY . therefore incorporate this in the equilibrium equation and obtain;-

$$\begin{aligned}
 Y - \Delta Y &= \frac{1}{1-b} \{a - b(T + \Delta T) + I + G\} \\
 &= \frac{1}{1-b} \{a - bT - b\Delta T + I + G\} \dots\dots\dots(39)
 \end{aligned}$$

The effect of the ΔT on the equilibrium level of income can therefore be obtained by subtracting Eq38 from 39. The results is;-

$$\begin{aligned}
 \Delta Y &= \frac{1}{1-b} \{-b\Delta T\} \\
 \Delta Y &= \frac{-b\Delta T}{1-b} \dots\dots\dots(40)
 \end{aligned}$$

Therefore the tax multiplier (T_m) can be obtained by dividing both sides of the E.q. by the ΔT

We obtain $T_m = \frac{\Delta Y}{\Delta T} = \frac{-b}{1-b} \dots\dots\dots(41)$

The negative sign of the multiplier indicates the negative effect of the tax Multiplier on the level of national income.

The Balanced Budget Multiplier

The balanced budget multiplier theorem states that the balanced budget multiplier is always equal to one. Therefore this theorem is also called the unit multiplier theorem. This however have been discussed above this can be modified as;- i.e. replacing

$$Y = \frac{1}{1-b} (a - \bar{T} + I + G) \dots\dots\dots$$

(42)

Now incorporate ΔG and ΔT (while change $\Delta G = \Delta T$) doing so the above equation takes the following form

$$Y + \Delta Y = \frac{1}{1-b} \{a - b(\bar{T} + \Delta T) + I + G + \Delta G\} \dots\dots\dots$$

(43)

Subtracting 42 from 43 we obtain

$$\Delta Y = \frac{1}{1-b} \{-b\Delta T + \Delta G\} \dots\dots\dots(44)$$

Since $\Delta T = \Delta G$ in the balanced budget, by substituting ΔG for ΔT , we obtain

$$\Delta Y = \frac{1}{1-b} \{-b\Delta G + \Delta G\} \dots\dots\dots,$$

(45)

Rearranging the terms

$$\begin{aligned} \Delta Y(1-b) &= -b\Delta G + \Delta G \\ \Delta Y(1-b) &= \Delta G(1-b) \\ \therefore \Delta Y &= \Delta G \end{aligned} \dots\dots\dots$$

(46)

The balance Budget multiplier BB_m can be obtained by dividing both sides by ΔG .

Thus,



$$BB_m = \frac{\Delta Y}{\Delta G} = \frac{\Delta G}{\Delta G} = 1$$

Alternatively it can be obtained by adding up G_m and T_m as

$$\begin{aligned} BB_m &= G_m + T_m \\ &= \frac{1}{1-b} + \frac{-b}{1-b} \\ &= \frac{1-b}{1-b} = 1 \end{aligned}$$

C. Income Determination in Open Economy Model:- A Model with the Foreign Sector

This is the analysis of the income determination in a four sector model

Exports, Imports and The Aggregate Demand

We will start with the analysis of separate impact of imports and exports on level of income and later on

Export Function and Export Multiplier

Just like C, I and G exports of goods and services constitute a part of the aggregate demand in an economy and its effect on the economy is also the same. The only difference is the demand for C, I and G originate from domestic demand while that of exports originate outside the economy (external demand)

Export Function.

Exports of a country are a function of a number of external and internal factors. Some of this include;- domestic prices of exports in relation to those in importing countries, level of income of the importing countries, importers income elasticity for imports, tariffs and trade policy ,etc in practice however exports of a country are determined by external and exogenous factors

Exports and Aggregate Demand

Exports constitute part of the aggregate demand. It results in inflows of incomes from abroad. Part of this is consumed while part is saved. The increase in consumption due to increase in exports affects the economy the same way as the increase in consumption due to change in income. Therefore

$$AD = C + I + G + X$$

Assuming there are no imports, equilibrium level of income will be given as

$$Y = C + I + G + X$$

Where, $C = a + b(Y-T)$

The level of income in an economy can be presented as

$$Y = a + b(Y-T) + I + G + X$$

$$\boxed{Y = \frac{1}{1-b} \{a - bT + I + G + X\}} \dots\dots\dots(4)$$

Exports Multiplier

Given the above income equation, the multiplier can be obtained by introducing the change in exports(ΔX). This can be written as;-

$$Y + \Delta Y = \frac{1}{1-b} \{a - bT + I + G + X + \Delta X\} \dots\dots\dots(5)$$

Subtracting Eq4 from5 we obtained

$$\Delta Y = \frac{1}{1-b} (\Delta X)$$

$$\boxed{\frac{\Delta Y}{\Delta X} = \frac{1}{1-b} = X - multiplier} \dots\dots\dots(6)$$

This implies that increase in exports results in increase in income at the rate of exports multiplier. Note that exports multiplier equals the investment multiplier, that $1/(1-b)$ where $b = MPC$.

Import Function

Imports are purchases of goods and services from abroad. Payments for imports are a leakage from the income stream because payments made for imports make the domestic incomes flow out of the economy. The level of imports determines the level of outflow of domestic income.

Just like exports, imports are determined by a number of external and internal factors. The major determinants of imports in a country include;-

- I) Prices of foreign goods and services in relation to domestic prices
- II) Income levels in the domestic country
- III) Income elasticity of imports
- IV) Tariff rates and foreign policy of the country
- V) Etc

There are two variables which are captured in the short run import function i) the level of income and ii) autonomous imports, import function can be expressed as

$$M = \bar{M} + mY \quad \dots\dots\dots (7)$$

Where \bar{M} is constant, autonomous imports and m is marginal propensity to import

Imports and Aggregate Demand

The aggregate demand in equation 1 is reduced by the size of imports (M). This negative impact of imports on aggregate demand is accounted for by including imports as a negative value in aggregate demand function. Hence the aggregate demand equation for an open economy is;-

$$Y = C + I + G + (X - M) \quad \dots\dots\dots (8)$$

This means that if $M > X$, the aggregate demand decreases, and if $X > M$ the aggregate demand increases.

National income Equilibrium in a Four-Sector Model

At equilibrium the level of national income equals the aggregate demand as given in equation 8. The four sector model can be presented as

$$Y = C + I + G + \{X - M\} \quad \dots\dots\dots (9)$$

Where

$$C = a + b(Y - T) \quad \dots\dots\dots (10)$$

$$M = \bar{M} + mY \quad \dots\dots\dots (11)$$

And I and G are constant

The equilibrium level of national income can now be obtained by substituting Eq 10, 11 in 9. Thus at equilibrium

$$Y = a + b(Y - T) + I + G + (X - \bar{M} - mY) \quad \dots\dots\dots (12)$$

Simplifying we get

$$Y = \frac{1}{1 - b + m} \{a - bT + I + G + X - \bar{M}\} \quad \dots\dots\dots (13)$$

In Eq 13, the term **$1/(1 - b + m)$** is foreign trade multiplier when consumption and imports are both a linear function of income.

Foreign Trade Multiplier

Given the equilibrium Eq 13 let exports increase by ΔX , all other variables remain constant. The equilibrium of the national income can then be written as;

$$Y + \Delta Y = \frac{1}{1-b+m} \{a + bT + I + G + X - M + \Delta M\} \dots\dots\dots (14)$$

This equation can also be written as

$$Y + \Delta Y = \frac{1}{1-b+m} \{a - bT + I + G + X - M\} + \frac{1}{1-b+m} \Delta X \dots\dots\dots (15)$$

Subtracting Eq 13 for Y from 15, we obtain

$$\Delta Y = \frac{1}{1-b+m} \Delta X \dots\dots\dots(16)$$

Rearranging E.q 16 we obtain foreign trade multiplier as

$$\frac{\Delta Y}{\Delta X} = \frac{1}{1-(b-m)} \dots\dots\dots(18)$$

This equation gives an important conclusion, that is if $b = m$, the foreign trade multiplier is equal to unity, if $b > m$, foreign trade multiplier is greater than unity and *vice versa*

A Complete Four-Sector Model of Income Determination

The four sector model in Eq 12 assumes, for simplicity that tax is a constant factor, and transfer payments equals to zero ($G_t=0$). However in reality this is not the case, therefore in these section we drop this assumptions and present a complete four-sector model. Assume that

$$\begin{aligned} T &= \bar{T} + tY \\ G_t &= \bar{G}_t > 0 \end{aligned} \dots\dots\dots(19)$$

$$\dots\dots\dots(20)$$

With these assumptions, the equilibrium level of the national income can be expressed as:

$$Y = C + I + G + \bar{G}_t + (X - M) \quad \dots\dots\dots(21)$$

Where

$$C = a + b \bar{Y}_t + \bar{C}_t \quad \dots\dots\dots(25)$$

Substituting E.q 22 through 25 in E.q 21 we get a reduced form of equilibrium equation as;-

$$Y = \frac{1}{1 - b + bt + m} \{a - b\bar{T} + b\bar{G}_t + I + G + X - \bar{M}\}$$

$$Y = \frac{1}{1 - b(1 - t) + m} \{a - b\bar{T} + b\bar{G}_t + I + G + X - \bar{M}\} \quad \dots\dots\dots(26)$$

The Foreign Trade Multiplier (F_m) with Tax Function

Given the equilibrium Eq 26 the foreign trade multiplier can now be worked out as follows.

Suppose a countries' exports increase by ΔX. with increase in the exports, the equilibrium equation can be written as;

$$Y + \Delta Y = \frac{1}{1 - b(1 - t) + m} \{a - b\bar{T} + b\bar{G}_t + I + G + \bar{M} + \Delta X\} \quad \dots\dots\dots(27)$$

By subtracting Eq 26 from Eq 27 we obtain

$$\Delta Y = \frac{1}{1 - b(1 - t) + m} \Delta X \quad \dots\dots\dots(28)$$

The foreign trade multiplier in a complete four-sector model can be expressed as

$$F_m = \frac{\Delta Y}{\Delta X} = \frac{1}{1 - b(1 - t) + m} \quad \dots\dots\dots(28)$$

This is a complete foreign trade multiplier (four sector model.)

Illustration

Recall equation **21**

$$Y = C + I + G + \bar{G}_t + \{X - M\}$$

Given the following information

$$Y = 100 + b(Y - T - tY + \bar{G}_t)$$

$$I = 200 \quad G = 100$$

$$\bar{T} = 100 \quad \bar{G}_t = 50$$

$$X = 20 \quad M = 10 + 0.1Y$$

$$B = 0.8 \quad t = 0.25$$

Soln.

$$\begin{aligned} Y &= 100 + 0.8(Y - 100 - 0.25Y + 50) + 200 + 100 + (20 - 10 - 0.1Y) \\ &= 100 + 0.8Y - 80 - 0.2Y + 40 + 200 + 100 + 10 - 0.1Y \\ Y - 0.8Y - 0.2Y + 0.1Y &= 100 - 80 + 40 + 200 + 100 + 10 \\ Y\{1 - 0.8 + 0.2 + 0.1\} &= 370 \\ Y &= \frac{1}{0.5}\{370\} = 740 \end{aligned}$$

Alternatively

The parametric values can be substituted straightaway in the reduced form of the equilibrium equation 27

$$Y = \frac{1}{1 - b(1 - t) + m} \{a - b\bar{T} + b\bar{G}_t + I + G + X - \bar{M}\}$$

$$\begin{aligned}
 Y &= \frac{1}{1 - 0.8(1 - 0.25) + 0.1} \{100 - 0.8 \times 100 + 0.8 \times 50 + 100 + 10\} Y \\
 &= \frac{1}{0.5} \{100 - 80 + 40 + 200 + 100 + 10\} = \frac{1}{0.5} \{370\} \\
 Y &= 2(370) \\
 &= 740
 \end{aligned}$$

CONSUMPTION THEORIES

INTRODUCTION:

The development in this sector have been hindered by lack of empirical evidence to support the various hypothesis that were developed by economist. However, the economist generally agree that the household consumption experience is a function of house hold income. But they are not unanimous on which income ;- absolute or relative income, current or expected future income, short-run or permanent income or income-cycle over life time. Different economists have linked consumption expenditure to different concepts of income and to factors other than income. This led to emergence of four major contributions to the theory of consumption.

- i) Absolute-Income Hypothesis,
- ii) Relative-Income Hypothesis,
- iii) Permanent-income Hypothesis and lastly
- iv) Life-cycle Hypothesis.

The Absolute Income Hypothesis: Keynesian Theory.

Properties

Keynes consumption theory is based on fundamental Psychological law. Where it is believed that men are disposed, as a rule and on average, to increase their consumption as their income increases, but not by as much as the increase in their income. This therefore means $\Delta c/\Delta Y$ is positive and less than unity. This theory emerges from the knowledge of human nature and on facts. According to Keynes household decide their current consumption expenditure on the basis of their **current Income**. Based on this current consumption expenditure, depends on the current and absolute level of income. Formally this can be presented as current consumption is a function of the current income. i.e

$$C=f(Y)$$

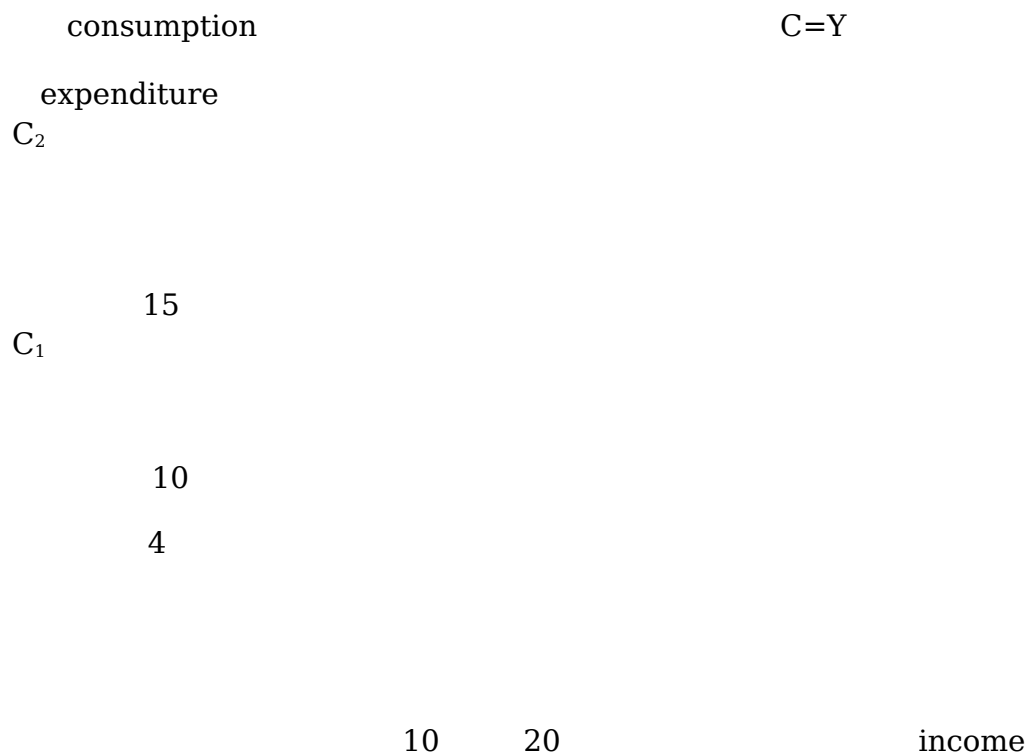
Where c= current consumption and Y= current income.

The main properties of the Keynesian consumption function can be summarized as ;-

- a) The real consumption expenditure(c/p) is appositive function of the real current disposable income Y_d/p . in other words, $C=f(Y)$ and $\Delta C/\Delta Y > 0$. This relationship between consumption and income makes the absolute income Hypothesis.

- b) The marginal propensity to consume (MPC) i.e the proportion of the marginal income consumed. $0 < MPC < 1$ (0 and 1 being included)
- c) The MPC declines as income increases, that is, the proportion of marginal income consumed keeps on decreasing as income increases.

The Keynesian hold the $MPC = APC$ i.e $\Delta C / \Delta Y = C / Y$



A number of comparative studies have been conducted and have supported the Keynesian view of consumption. A straight line consumption function of the form $C=a+bY$ represents the absolute income hypothesis. Where a is the autonomous consumption and b is the MPC

Draw back of Absolute Income Hypothesis

- i) It is based on introspection rather than facts

- ii) The second property have not only failed to meet empirical test but have also been a major source of controversy.

The Relative Income Hypothesis:- Duesenberry's Theory

The failure of Keynes Absolute consumption theory opened room for further research on consumption. Duesenberry was the first to make this attempt in 1940's using income consumption Data in 1940's he propounded the Relative income Hypothesis. He linked the consumption level to household consumption to consumption and expenditure of comparable group. The relative income theory of consumption states that the proportion of consumers income consumed depends on the level of his income in relation to the household with which it identifies himself with, not on its absolute income.

Therefore it can be observed that

- i) If income of all the households belonging to the group increases by about the same rate, then the consumption level of all the households of the group, including household X goes up at the same rate
- ii) If household X remains at the same scale of relative income and its absolute income rises, then its absolute consumption and savings rise, but MPC remains the same as it was before the rise in its income
- iii) If household X remains on the same scale of relative income and its absolute income and income of other households of the group increases, then MPC of the household X with constant income increases
- iv) If household X moves up from a lower income-group to higher income group then its MPC decreases.

Shortcomings of Relative income Hypothesis

PERMANENT INCOME HYPOTHESIS

This theory was propounded by Milton Friedman, According to him it is permanent income not current income, which determines the level of consumption expenditure. This theory postulates that consumption is the function of permanent income

$$C = f(Y_p)$$

And that C is proportional to Y_p

$$C = kY_p$$

Permanent income, defined broadly, is the mean of all the incomes anticipated by the households in the longrun. The method of estimating permanent income, as described below, is an approximation of incomes anticipated from all human and non-human wealth (or capital). It means labour incomes plus capital incomes. If all materials, financial and human sources of income are treated as wealth, then the permanent income of the current year can be defined as

$$Y_p = rW$$

Where Y_p is the permanent disposable income with reference to the current year, W represents overall wealth and r is rate of return

Estimation of permanent income

$$Y_p = Y_t + (1-\beta)Y_{pt-1}$$

Criticism of permanent income Hypothesis

THE LIFE-CYCLE THEORY OF CONSUMPTION

The life-cycle theory of consumption popularly called the life-cycle Hypothesis was developed by Ando and Modigliani in the early 1960^s. Just like Friedman's theory, the life cycle theory too rejects the current income as the sole determinant of consumption. The life cycle Hypothesis postulates that individual consumption in any period depends on

- i) Resources available to the individual,
- ii) Rate of return on his capital
- iii) And the age of the individual

The resources available for an individual consist of his existing net wealth and the present value of all his current and future labour incomes. According to life-cycle hypothesis a rational consumer plans consumption on the basis of all his resources and allocates his income to consumption over time so as to maximize his total utility over his life time.

Basic propositions

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Intermediate Macroeconomics

The basic proposition of the life cycle hypothesis of consumption can be summarized as follows

- i) Total consumption of an individual depends on his current physical and financial wealth and his life-time labour income
- ii) Consumption expenditure is financed out of the life time income and accumulated wealth
- iii) The consumption level of a typical individual is more or less constant over his lifetime
- iv) There is little connection between current income and current consumption

This can be summarized as

$$C = aW_R + cY_L$$

Where W_R is real wealth, Y_L is Labour income, a is MPC of wealth income and c is MPC of labour income

Suppose an individual life expectancy is N years with his retirement age at R . he starts working at the age of B . his working life equals $R-B$ years.

Assumptions

- i) That the individual has no uncertainty about his longevity, employment and wealth condition
- ii) That he earns no interest on his accumulated savings
- iii) That he does not consume his total labour income
- iv) That prices remain constant.

With these assumptions, his lifetime income is estimated as follows

$$\text{Life time income} = Y_L(R-B)$$

Where Y_L = annual labour income, and $R-B$ is the number of working years. Assume $R-B=E_L$

We may redefine lifetime income as $= Y_L(E_L)$

WE can rewrite lifetime income as $=Y_L(E_L)$

Consumption can therefore be obtained as

$$C = \frac{Y_L \times E_L}{N}$$

NON-INCOME FACTORS AFFECTING CONSUMPTION

It is clear from the above theories that it is not only income that determines consumption, there are other non income factors that play in the determination of consumption. This factors include

- i) Interest Rate
- ii) **Price level**
- iii) **wealth** etc
- i) interest Rate and consumption**

MONEY MARKET ANALYSIS:

THE THEORY OF MONEY AND INTEREST

THE SUPPLY OF MONEY

Introduction

Both excess and shortage of money are harmful to the economy. Therefore, money supply has to be controlled and regulated in accordance to requirement of the economy. It is on this reason that measuring money supply becomes inevitable. We are going to discuss three major aspects of money supply. i) the sources of money, ii) the measures of money supply iii) the theory of money supply.

The Sources of Money Supply

The central bank of a country- the central bank is the main source of money supply in country. The money supplied by the central bank is known as high power money. However, the central bank is not the only source of money used as a medium of exchange. The next source of money in the economy is the banking systems. Banks create money supply in the process of lending and borrowing, this type of money is called credit money, The high powered money and credit money constitute M1 supply of money(the total money stock).

Central Bank and Money Supply

The central bank is the only Authority that issues currency in a country. This currency is called the high powered money, because it is backed by reserves and its value is guaranteed by the government and also it is the source of all other money. Under the minimum reserve system the central bank is required to keep a certain minimum reserve of gold and foreign securities and is empowered to issue currency at any extend.

Measurement of High Powered Money

High powered money is measured as

$$H = C + R + OD$$

Where C= currency held by the public, R = cash reserves of the commercial Banks, OD = other deposits with central bank. But since other deposits are insignificant, high power money supply is therefore measured as $H = C + R$

Money Creation by Commercial Banks

Commercial banks are the second most important source of money supply. the money supplied by commercial banks is called credit money. This is an out

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Intermediate Macroeconomics

commercial banks operations of leading and borrowing. The money deposited with banks is called primary deposits. Deposits are made by people out of three accounts i) house hold savings, ii) payments received from central bank for sale of bonds, iii) payments received from abroad iv) money deposited for convenience in transactions., on the basis of this primary deposits banks create secondary deposits called derivative deposits. It is the value of derivative deposits that constitute money supply by the commercial banks. This process starts with banks leading the deposited money. The banks are required to maintain two kinds of reserves

- i) Statutory reserve(SCR):- required by the central banks as mandatory cash reserve
- ii) Banks excess reserve (ER)

Deposit Creation in Single Bank Model

Assumptions

- i) There is a single model
 - ii) The banks accepts only demand deposits
 - iii) The banks cash reserve requirement is given
 - iv) Bank holds its assets only in the form of cash reserves and loans
- Suppose on the first day of accounting year and individual A deposits sh 100 thousand with the bank. All deposits with the bank are its liability. Now the balance sheet of the monopoly bank is as follows

The Deposit Multiplier

As noted above primary deposit leads to the creation of derivative deposits, which add up to a multiple of the primary deposits. In the above example an initial deposit of sh 100 thousand leads to a total deposit of sh 500 thousand. The deposit multiplier can be obtained as

$$d_m = \frac{\text{Total Additional Deposit}}{\text{Total Additional Cash Reserve}} = \frac{\Delta TD}{\Delta TR} = \frac{500,000}{100,000} = 5$$

Where ΔTD = Total deposit created by the banks (including initial deposit), and ΔTR = change in total cash reserves of the bank.

Credit Multiplier

Credit multiplier can be defined as the ratio of additional credit creation (ΔCC) to the total cash reserves (ΔR), thus the credit multiplier C_m can be measured as:

$$\text{CreditMultiplier} = \frac{\Delta CC}{\Delta R}$$

In the above example, total creation (ΔCC) by the banks = sh 400 thousand, and total reserves (ΔR) = sh 100 000, thus the credit multiplier can be obtained as

$$C_m = \frac{\Delta CC}{\Delta R} = \frac{400,000}{100,000} = 4$$

Classical Theory of Money and Interest

The origin of the theory of the demand for money is traced in the classical quantity theory of money.

The Classical Quantity Theory of Money

The classical quantity theory of money was propounded by Jean Bodin in 1568 in attempt to explain the price rise in France. After that there were several writers on this concept, However the Fisher's version of quantity theory of money became the most famous version and represented the classical approach to the analysis of the relationship between the quantity of money and price level. The neo classical version of quantity theory of money is known as Pigou's cash-balance equation. All the versions of quantity theory of money showed that there is a strong relationship between money and price level

Fisher's Quantity Theory of Money and Price Level

Fisher's version of the quantity theory of money, or as it was originally called quantity theory of exchange is formally expressed as

$$MV = \sum pQ$$

Fisher gave simplified version of this equation as

$$MV = PT$$

Where

- i) M represents the quantity of money in circulation
- ii) V is the transaction velocity of money, i.e. the number of times a unit of money is used in transaction per unit of time.
- iii) $\sum pq = p_1q_1 + p_2q_2 + \dots + p_nq_n$ where q_1, q_2, \dots are the output of individual commodities and p_1, p_2, \dots are their prices, (respectively).

- iv) P is weighted average of all individual prices and $P = MV/T$
- v) T is the sum of all the transactions of goods and services per unit of time (including transaction velocity of goods and services)

Fisher expand Equation to include the money supply created by the banks through the process of credit creation as follows

$$MV + M'V' = PT$$

Where M' and V' are the total bank deposits subjected to transactions and average velocity of their circulation respectively.

Uses of Fisher's Quantity Theory of Money

The fisher's quantity theory has two major uses

- i) **The classical theory of price level.** This theory implies that the quantity of money determines the general level of prices. This conclusion follows directly from Fisher's equations;- $P = MV + M'V'/T$. if V and T remain constant, P changes proportionately to the change in M and M'. where M is doubled too. P is doubled too.
- ii) **The Demand for Money.** Although Fisher did not state it specifically, the demand for money is implicit in his quantity theory. Laidler stated that the demand for money depends on the value of transactions to be undertaken in the economy and is equal to a constant fraction of those transactions and given the supply of money, in equilibrium, the demand for money must be equal to its supply. this equilibrium demand of money can be derived from simple version Fisher's quantity theory of money as follows

$$M\bar{V} = P\bar{T}$$

WHERE V and T are constants

Given the equilibrium equation

$$M = \frac{1}{\bar{V}} P\bar{T}$$

Since at equilibrium, demand for money (M_d) equals the supply of money (M_s), M can be taken as M_s and the term $1/V(P\bar{T})$ as M_d it can then be construed that at equilibrium demand for money equals $1/V$ fraction of total value of transactions ($P\bar{T}$). it implies that the quantity of money demanded is determined by the inverse of money velocity given P and T. therefore assuming $1/V = k$, the demand for money equation can be given as

$$M_d = kP\bar{T}$$

Where $M_d = kPT$ i.e demand for real balances

Since the economy is always in equilibrium the demand for money will always equal to supply of money. Considering $PT = Y =$ aggregate national income, the classical money demand function can be expressed as

$$M_d = kY$$

This implies that the aggregate demand of money is proportional to k proportion of national income.

Criticism of Fisher's Quantity Theory

The following criticism have been leveled against Fisher's quantity theory

- i) Fisher's transaction equation is a truism, it has no theoretical value
 - ii) It does not explain how a change in M changes P
 - iii) It is static theory as it is based on the assumption that M and V and M' and v' have fixed relationship which is not realistic
 - iv) M refers to a point of time and V to a period of time.; this means internal inconsistency
 - v) Price (P) is regarded to be only a passive factor which is unrealistic because it does not affects outputs
 - vi) Not only M determines P , but also P determines M - this is Keynes' contra-quantity theory causation arguments
- However some economist have supported the Fisher's quantity theory of money

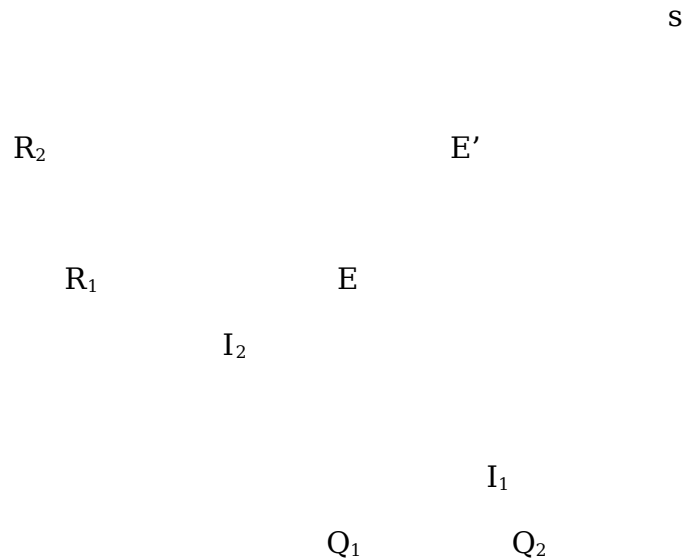
The Classical Theory of Interest

It must be noted that according to the classical and neo-classical view, interest rate is determined by the total supply of and total demand for money but by only that part of total money which is saved for investment.

According to the classical theory of interest, as constructed by Keynes, the rate of interest is determined by the funds demanded for investment and supply of savings. According to Keynes Investment represents the demand for investible resources; savings represent the supply, and the rate of interest is the price of investible resources.

This classical theory of interest is illustrated below. Investment is an inverse function of interest rate. That is, demand for investible funds

increases when interest rate function of the interest rate. i.e demand for investible funds increases when interest rate decreases and vice versa.



The Keynesian Theory of Money and Interest

The Classical and Neoclassical Views on Holding Money

The classical economists treated money only as a medium of exchange. In their opinion, therefore people hold money only for transaction purposes. They held the view that people do not hold any idle cash balances in excesses of their transaction demand because it involves loss of interest. The classical economist did not recognize the asset function or the store of value functions of money. The classical money demand function is given as

$$M_d = kY$$

Where $M_d = M/P$ i.e demand for real cash balance

The Keynesian Theory of Demand for Money

Keynes built his theory of demand for money i.e his Liquidity preference theory, on the Cambridge cash-balance approach to the demand for money. It is in fact an extension of the Cambridge theory of money. According to Keynes, money is demanded for three motives

- i) Transaction motive

- ii) Precautionary motive
- iii) Speculative motive

The Transaction Demand for Money

The need for holding money arises because there is a time gap between the receipt of income and expenditure. For example the salaried people. Therefore money is held for the purpose of carrying transactions. Transaction demand for money is positively related to the level of income. It is important to note here that Keynes assumed prices (p) to remain constant. Therefore his demand for money implies demand for real cash balance and income refers to real income. People know by their experience the amount of money they need for transacting their planned expenditure. The higher the level of income, the higher the demand for money. In fact the aggregate demand for transaction money is the sum of individual demands. According to Keynes, the aggregate transaction demand for money is a positive function of the national income. i.e

$$M_t = f(Y)$$

Where M_t is transaction demand for money and Y is real income.

According to Keynes the proportion of income held for transaction motive is constant or fairly stable in the short run. Implying that given the income and its distribution, the short-run relationship between income and transaction demand for money can be specified as

$$M_t = kY$$

Where k is a constant proportion of income demand for transaction purpose

This relationship between income and transaction demand for money can be presented graphically as follows.

QD for
Money

$$M_t = kY$$

$$\frac{\Delta M_t}{\Delta Y} = k$$

$$\Delta M_t$$

$$\Delta Y$$

Real national income (Y)

The Precautionary demand for Money

Keynes argued that both household and business firms hold some money in excess of their transaction demand to provide for unforeseen contingencies. The need for contingent expenditure arises due to unforeseen and unpredictable events like fire, theft, sickness, loss of job, accidents, deaths of bread winner etc. to protect and promote against such contingencies and unforeseen opportunities, people do hold some idle cash balance. The money held for this motive is called precautionary demand for money

Just like transaction demand for money, precautionary demand for money is also closely and positively related to the level of income. The higher the level of income, the higher the demand for money for precautionary motive. This can be presented as

$$M_p = f(Y)$$

Since both transactionary and precautionary demands for money are a function of income Keynes lump them together and expressed them as $M_t + M_p = M_T$

Thus the Keynes total transaction demand for money can be expressed as

$$M_T = f(Y) = kY$$

The Speculative Demand for Money

According to Keynes, people hold part of their income also in the form of idle cash balance for speculative purposes. The desire to hold idle cash balance for speculative purposes arise from the desire to take advantage of the changes in the money market. Specifically the asset market. According to Keynes it is rational to hold idle cash balance instead of holding a bond if the rate of interest is expected to rise in future, if the interest does increase in future bond prices goes down.

Thus if a person decides to hold idle cash balance in expectation of a rise in interest rate under the condition of uncertainty, the person is speculating. Speculation therefore involves an element of risk. Keynes called this kind of cash balance ***speculative demand for money***.

With increase in market rate of interest, the market value of the bond decreases and involve a capital loss. Therefore the preference for bond will decrease and the speculative demand for money will too decrease. This therefore implies that as the rate of interest increase the speculative demand for money decreases

The Liquidity Trap

Keynes has hinted at a remote possibility of a situation when the market rate of interest falls to a critical minimum level, and the liquidity preference curve becomes flat. It implies that the speculative demand for money becomes infinitely large or elastic when the rate of interest goes below a critical minimum level- a level below which people prefer to hold idle cash balance and banks pull down their shutters. According to Keynes this is liquidity Trap. This can be represented as follows

I_3

I_2

Liquidity Trap

I_1



Integration of Product and Money Market Equilibrium

IS-LM in a Two-Sector economy

The integration of the product and money markets to show how equilibrium of both sectors coincide at the same level of income and interest rate is presented by what we call the IS-LM Model. In this case IS represent the product market sector equilibrium condition ($I=S$) and LM represent the money market equilibrium condition (L-M) **where L stands for liquidity preference or money demand (M_D)** and M stand for money supply (M_s)

Interdependence of product and money markets

It should be noted that the working of product and money markets are interlinked and interdependent. The two most important variables that interlink the working of the two sectors are investment and interest rates. Investment (I) is a product-market variable- it determines the level of real output. And interest rate (I) is a money market variable determined by the demand for and supply of money.

Dependence of Product Market on Money market

The product market attains its equilibrium at the level where $Y=C+I$ from the Keynesian analysis I was assumed to be constant factor i.e Autonomous variable. However in reality I is not autonomous it is determined within the system also by the level of income and interest rate. Given income investment depends on the rate of interest rate. Assuming constant $\Delta I/\Delta i$, the inverse relationship between the investment (I) and the interest rate (i) is stated by a linear investment function of the following form

$$I = \bar{I} - hi, (h > 0)$$

Where I = autonomous investment, i = interest rate and $h = \Delta I/\Delta i$

Given that $Y = C + I$

And given that consumption is a function of income(Y) and given investment, then the above equation can be presented as

$$Y = C(Y) + I(i)$$

This implies that unless i is determined I and unless I is determined that Y is determined.

Dependence of Money market on Product Market

In Keynesian system, money market reaches its equilibrium where

$$M_s = M_d$$

And interest rate is determined where $M_s = M_d$

As noted earlier $M_d = M_t + M_{sp}$

Where $M_t = kY$ and $M_{sp} = f(i)$

Therefore $M_d = kY + f(i)$

This implies that unless Y is determined, kY cannot be determined and therefore, M_d cannot be determined, and unless M_d is determined money market equilibrium cannot be determined and interest (i) would not be determined.

Thus it can be concluded that unless product market reaches its equilibrium and Y is Known, money market cannot reach its equilibrium. Unless product market and money market reaches equilibrium simultaneously the economy cannot attain its general equilibrium nor can any of the two sectors be in equilibrium.

IS-LM MODEL; An elementary exposition

The IS-LM model combines the equilibrium conditions of the product and money markets to arrive at the general equilibrium.

Incorporating money markets variables interest (i) into the income determination model by replacing Keynes constant I with the investment function.

$$Y = C(Y) + I(i)$$

This function yields the IS curve. It shows the relationship between Y and I at different equilibrium levels of savings and investment ($I = S$) and the product market equilibrium at different levels of Y and i

Similarly the IS-LM model incorporates income , Y the main product-market variable, in the money market model by linking total demand for money to Y. this is done by using an M_t - function of the form $M_t=kY$ and an $M_{sp}=L(i)$ into the money model. The money-market equilibrium condition is then written as

$$M_s = M_d = kY + L(i)$$

This is the LM function which show the relationship between Y and I at different equilibrium levels of M_s and m_d it shows also the money market equilibrium at different levels of Y and i.

Finally, IS-LM model brings the IS and LM functions together and lays down the condition for the general equilibrium as

$$IS = LM$$

$$C(Y) + I(i) = kY + l(i)$$

$$\text{Or } C(Y) + I(i) = kY + L(i)$$

If $C(Y)$, $I(i)$, kY and $L(i)$ functions are known, the equilibrium values of Y and I can be easily obtained.

The IS-LM is presented in the following form

- i) Derivation of IS curve
- ii) Derivation of the LM curve
- iii) Presentation of IS-LM model of General Equilibrium

Derivation of IS Curve

The IS curve is a curve which shows the relationship between the rate of interest and the equilibrium level of national income, i.e $S=I$ at different rates of interest

According to Keynesian theory, product market equilibrium, $I=S$

Since $I = I(i)$

And $S = Y - C(Y)$

The product market equilibrium condition can be specified as

$$I(i) = Y - C(Y)$$

In order to present this function graphically let us suppose that these functions are estimated factually and are given as follows

$$I=200-2000i$$

$$C(Y)=10+0.5Y$$

$$S=Y-(10+0.5Y)$$

$$S=-10+0.5Y$$

This can be illustrated graphically as shown below

The 45° line gives the equilibrium levels of savings which will keep the product market in equilibrium, at different levels of investment, it implies that when investment increases, savings increases to the same extent since $S=Y-C(Y)$ income must increase for planned saving to increase

ALGEBRAIC VERSION OF THE IS-LM MODEL

Derivation of IS function. Algebraic Method

The IS function can be derived by using both the equilibrium conditions of the product market. The two equilibrium conditions are i) $AD=AS$ and ii) $I=S$. we will show here the derivation of the IS curve by using both methods

Derivation of IS by equilibrium condition $AD=AS$

in order to derive the IS curve, let us recall the product market model.

$$AD=Y=C(Y)+I(i)$$

Let us suppose that the terms $C(Y)$ and $I(i)$ are given in functional form as

$$C(Y) = a+bY$$

$$C(Y)=a+bY$$

$$I(i)=\bar{I}-hi$$

Where $h=\Delta I/\Delta i$

Given the consumption function and investment functions above, the equilibrium conditions can be given as

$$Y=a+bY+\bar{I}-hi$$

$$= \frac{1}{1-b} \{a+\bar{I}-hi\}$$

Illustration

Given the following equations, find the equilibrium market condition

$$C(Y) = 10 + 0.5Y$$

$$I(i) = 200 - 2000i$$

Soln

The product market condition is given as

$$Y = 10 + 0.5Y + 200 - 2000i$$

$$= \frac{1}{1 - 0.5} \{10 + 200 - 2000i\}$$

$$= 2 \{210 - 2000i\}$$

$$Y = 420 - 4000i$$

This can be presented graphically as

Derivation of IS curve algebraic method

i

$$Y=420-4000i$$

Derivation of LM curve

Recall money market equilibrium conditions

$$M_d = M_s$$

$$M_d = M_t + M_{sp}$$

$$M_t = kY, (k > 0)$$

$$M_{sp} = L(i)$$

In the keynesian system, the M_{sp} demand function is a curvilinear schedule with a part made of straight horizontal line, that part showing liquidity trap . For convenience we assume a straight line

Where L and l are constants i is interest rate and $l = \Delta M_{sp} / \Delta i$

Given the M_t and M_{sp} the functions, the M_d function can be expressed as

$$M_d = kY + (L - li)$$

Money supply M^s is assumed to remain constant in the entire analysis of the money market equilibrium. The price level (P) is also assumed to remain constant. Therefore the nominal money supply equals the real money supply often denoted as M^s/p

$M_{sp} = \bar{L} - li$ The money market equilibrium condition can now be expressed as

$$\bar{M}^s = M_d$$

$$\bar{M}^s = kY (\bar{L} - li)$$

this is the money market equilibrium

Rearranging the terms we obtain

$$Y = \frac{1}{k} \{ \bar{M}^s - \bar{L} + li \}$$

This is the LM function which can be used to derive the LM curve. Note that this is a linear LM curve

Illustration

Assume that the money market model is given as

$$\bar{M}^s = 150$$

$$M_t = kY = 0.5Y$$

$$M_{sp} = \bar{L} - li = 150 - 1500i$$

$$M_d = kY + \bar{L} - li = 0.5Y + 150 - 1500i$$

By substituting values from this model in the LM model we get

$$Y = \frac{1}{0.5} \{ 150 - 150 + 1500i \}$$

$$Y = 3000i$$

This can be presented graphically as follows

$$Y=3000i$$

LM

Integration of IS and LM (Equilibrium of the money and product markets)

Having derived the IS and LM functions, we may now combine the two functions and find the value of Y and I that conform to the general equilibrium – the equilibrium of the product and money markets at the same levels of Y and i. as noted earlier, the general equilibrium takes place where $IS=LM$

Now recall that

$$\text{IS function is } Y=420-4000i$$

$$\text{And LM function is } Y=3000i$$

Find the equilibrium values of i and Y

Substituting this equations we have

$$420-4000i=3000i$$

$$7000i=420$$

$$I=0.06 \text{ or } 6\%$$

The equilibrium level of income is obtained by substituting interest rate to any of the models

Considering IS

$$\begin{aligned} Y &= 420 - 4000i \\ &= 420 - 4000(0.06) \\ &= 180 \end{aligned}$$

It therefore means that at interest rate of 6% the equilibrium level of income is sh 180 billion. Conclusion is that economy reaches equilibrium at interest of 6% and national income of sh 180

THE IS-LM MODEL WITH THE GOVERNMENT SECTOR

IS-curve with the government Sector

As easy way to derive the IS curve with government sector is to construct the three sector product market model. This can be done by incorporating the three sector G and T variables into the two sector market model. This is given as

$$C + I = C + S$$

Incorporating these three sector variable we obtain.

$$C + I + G = C + S + T$$

Having recalled this we now proceed to derive the Hochsian IS Model. Hence we split this exercise into two i) IS Model with a lump-sum tax

iii) And finally IS model with a tax function

IS Model with Lump-sum Tax

Assumptions

- i) The Government spending is determined exogenously
- ii) Lump-sum tax is determined exogenously
- iii) The government follows a balanced budget

The market equilibrium will be presented as follows

$$C + G = C + T$$

Given the following functional form of the above variables

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$$C = a + bY_d \quad (\text{where } Y_d = Y - T)$$

$$I = \bar{I} - hi \quad (h = \Delta I / \Delta i \text{ and } h > 0)$$

$$S = -a + (1-b)Y_d$$

$$G = G$$

$$T = T$$

$$\text{And } G = T$$

Given this functional functions the IS model can be presented as

$$I + G = S + T$$

$$\bar{I} - hi + \bar{G} = -a + (1-b)(Y - T) + \bar{T}$$

Suppose you are give the following structural equations

$$I = 200 - 2000i$$

$$S = -10 + 0.5(Y - T)$$

$$G = T = 40$$

By substitution, IS Model given will be obtain as

$$200 - 2000i + 40 = -10 + 0.5(Y - 40) + 40$$

$$240 - 2000i = 0.5Y + 10$$

$$Y = 460 - 4000i$$

Sketching this we obtain an IS curve

IS Model II: The IS model with Tax function

The above model is a three sector IS model with lump-sum tax incorporating the specific tax we obtain a IS model with Tax Function. Given the following structural.

$$C = a + bY_d$$

$$I = \bar{I} - hi$$

$$G = \bar{G}$$

$$T = \bar{T} - tY$$

The product market equilibrium can now be written as follows

$$\begin{aligned} Y &= C + I + G \\ &= a + b[Y - (\bar{T} + tY)] + \bar{I} - hi + \bar{G} \\ &= a + bY - b\bar{T} - btY + \bar{I} - hi + \bar{G} \\ \therefore Y &= \frac{1}{1 - b(1 - t)} \{a - b\bar{T} + \bar{I} - hi + \bar{G}\} \end{aligned}$$

Illustration

Given the following structural equation the IS curve in a three sector with tax function can be derived as:-

$$C = 100 + 0.75(Y - T)$$

$$I = 200 - 2000i$$

$$G = 100$$

$$T = 80 + 0.2Y$$

Given the numerical model, we can now derive the product market equilibrium condition

$$I + G = S + T$$

Work out for Saving as

Given consumption

$C = 100 + 0.75(Y - T)$ the S function can be derived as

$$S = -100 + 0.25(Y - T)$$

Substituting the relevant functions in the equilibrium function we obtain

$$200 - 2000i + 100 = -100 + 0.25\{Y - (80 + 0.2Y)\} + 80 + 0.2Y$$

Therefore

$$Y = 1000 - 5000i$$

Measuring the effect of Fiscal Changes on the product Market Equilibrium

The fiscal changes may take any one of the following forms

- i) Change in government spending

- ii) Change in tax rate
- iii) Simultaneous change in both G and t
- iv) And lastly combinations of change in t and G
- i) Increase in G**

As noted earlier product market equilibrium without change in fiscal policy is given by $I+G=S+T$. in order to measure the effect of the change in G, lets assume that the government spending increase from sh 100 billion to sh 200 billion

Assuming $i=0.06$

$$Y=1000-5000(0.06)$$

$$=700$$

When G increase we obtain

$$200-2000(0.06)+200=-100+0.25\{0.25-(80+0.2Y)\}+80+0.2Y$$

$$280=-40+0.4Y$$

$$Y=800$$

Therefore due to increase in government spending from sh 100 billion to 200 billion the level of national income increases from 700 billion to 800 billion

ii) Decrease in Tax Rate

To measure the effect of tax cut , lets suppose that income tax rate is cut from 0.2 to 0.15 with $G=100$. With the tax cut, the equilibrium level of output will increase as

$$200-2000(0.06)+200=-100+0.25\{Y-(80+0.15Y)\}+80+0.15Y$$

$$280=-40+0.36Y$$

$$Y = 888.9$$

Deficit Financing and the IS Curve

Suppose that the product-market model is initially given as described earlier with investment function described as $I= 100-2000i$ and tax function modified as $T=0.2Y$. given the structural model, the product-market equilibrium can be expressed in terms of equilibrium condition

$$I+G=S+T$$

$$100 - 2000i + 100 = -100 + 0.25(Y - 0.2Y) + 0.2Y$$

$$200 - 2000i = -100 + 0.4Y$$

$$Y = 750 - 5000i$$

Now let's suppose the government decides to spend an additional amount of sh 100 billion for which it acquires finances by way of deficit financing. It therefore means that $\Delta G = 100$. With this change the product market equilibrium condition will be modified as follows

$$I + G + \Delta G = S + T$$

$$200 - 2000i + 100 = -100 + 0.4Y$$

$$300 - 2000i = -100 + 0.4Y$$

$$Y = 1000 - 5000i$$

Given interest rate of 6% the effect of deficit financing can be obtained by subtracting the initial equation with the second equation.

Therefore

$$\Delta Y = (1000 - 5000i) - (750 - 5000i)$$

$$= \{1000 - 5000(0.06)\} - \{750 - 5000(0.06)\}$$

$$= 250 \text{ billion}$$

The effect of deficit financing is the change in equilibrium level of income from

$$Y = 750 - 5000(0.06)$$

$$= 450 \text{ billion To } 700 \text{ billion}$$

Monetary Changes and Money-Market Equilibrium

In order to derive the LM- function let's recall our earlier M_d equation given as

$$M_d = M_t + M_{sp}$$

$$\text{Given our earlier } M_t = 0.5Y$$

$$M_{sp} = 100 - 2500i$$

Given the M_t and M_{sp} functions the M_d function can be expressed as

$$M_d = M_t + M_{sp}$$

$$M_d = 0.5Y + 100 - 2500i$$

Given that $M_s = 200$ then

$$200 = 0.5Y + 100 + 2500i$$

$$Y = 200 + 5000i$$

Change in Money Supply and shift in the LM curve

A change in Money supply causes a shift in LM curve. Suppose that the central bank increases the money supply by sh 100 billion so that the money supply rises to sh 300 billion. The money market equilibrium condition can be written as

$$M_s + \Delta M_s = M_d$$

Therefore

$$200 + 100 = 0.5Y + 100 - 2500i$$

$$200 = 0.5Y - 2500i$$

$$Y = 400 + 5000i$$

Shift in LM

Due to the change in money supply the LM curve will shift as follows

Interest

LM_0

LM_1

money supp 100 200 300 400 500

The product and Money Market equilibrium in a three sector IS-LM Model

Recall the product and money market models

Product market

$$C = 100 + 0.75(Y-T)$$

$$I = 200 - 2000i$$

$$G = 100$$

$$T = 0.2Y$$

Therefore the IS curve can be presented as

$$\therefore Y = \frac{1}{1-b(1-t)} \{a - b\bar{T} + \bar{I} - hi + \bar{G}\}$$

$$Y = \frac{1}{1-0.75(1-0.2)} \{100 + 200 - 2000i + 100\}$$

$$Y = 1000 - 5000i$$

Money Market Model

$$M_t = 0.5Y$$

$$M_{sp} = 100 - 2500i$$

$$M_s = 200$$

$$M_s = M_t + M_{sp}$$

$$200 = 0.5Y + 100 - 2500i$$

$$Y_{LM} = 200 + 5000i$$

The Equilibrium Condition

Given that

$$IS = LM$$

Then

$$1000 - 5000i = 200 + 5000i$$

$$800 = 10,000i$$

$$i = 0.08$$

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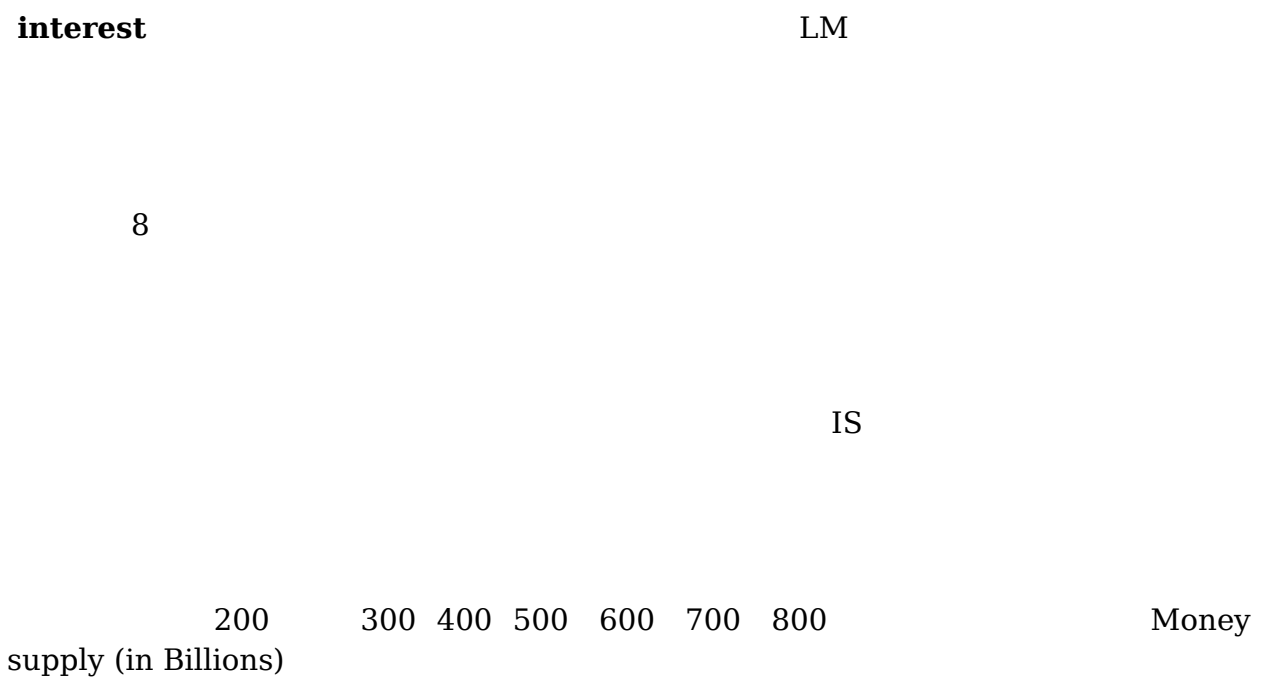
hence to obtain equilibrium income substitute the interest rate on any of the two equations (IS or LM)

using the IS equation

$$Y = 1000 - 5000(0.08)$$

$$Y = 600$$

Graphically this can be presented as follows



INFLATION

Inflation is defined as a situation where there is a persistent rise in the general price level. At this time the value of money is persistently falling.

General price level means that a number of commodity prices are considered. One cannot talk of inflation if one or two commodity prices have increased however much they might have done so.

Inflation can be classified according to state and cause. State of inflation means the speed at which prices keep on changing.

State of Inflation

Mild: (Creeping) state of inflation refers to a situation when the general price increase is gradual. It is not easy to notice the rises. The percentage rise is small over a long period of time. This kind of inflation is desirable as it gives incentives to producers while causing little effect to the consumers' incomes as well as their psychological aspects towards consumption.

Hyper: inflation sometimes known as galloping inflation or run-away inflation refers to a state when the increase in prices is so rapid. The public notices these rises and there is definitely a great effect on the economic activities in the economy.

Types of Inflation

Types of inflation are given according to the causes of the inflation in the economy.

Demand pull: inflation occurs when prices are pushed up by excessive aggregate demand for money to purchase few commodities available. Such inflation can be accelerated by further printing of money by the central bank or increasing government

expenditures or government borrowing from central bank or when there is increased forgery of the currency.

Cost push: inflation occurs when there is a rise in commodities' prices as a result of rising costs of production that is, in terms of factor costs (profits, rent, wages or interest) and raw material costs.

Bottleneck/Scarcity; inflation occurs when the general level of prices is pushed up due to structural shortages e.g. there might be exogenous (External forces) like wars, bad weather. Or it may be caused by breakdown of transport system, breakdown of production units especially in agriculture and industries. These breakdowns may result into what is known as *supply shock*. This is where there is shortage of commodities which lead to increase in prices of commodities.

Imported: inflation takes place when imported goods both for consumption and also for industrial and agricultural inputs are imported at higher and rising prices. This inflation can only make an impact on the local economy depending on how open the economy is. In case the economy is completely or relatively closed, the imported inflation will have no or little effect in the economy. Imported inflation may also be caused by buying from a country with inflation. In LDCs imported inflation has been a result of importing fuel at high prices where transport costs are affected and they reflect into the commodity prices.

Apart from the above singled out causes, it is important to note that the

economy can have a hyper inflation or mild resulting from a mixture of some of the causes or all the causes. And these, especially in LDC's, are always worsened by the government fiscal and monetary policies which may be intended to counteract the inflation or intended for development without considering well the economic status of the country.

Effects of Inflation

1. **On production:** Mild inflation encourages production and hence a sign of a growing economy. On the other hand, hyper inflation discourages production and encourages speculation.

2. **On Income distribution:** the tendency of the inflation to get out of control is the most serious one and this usually results into inequality in income distribution. In such inflation the lenders lose while the borrowers gain. Same way, the profit earners and other groups whose incomes are not fixed stand to gain but those with fixed incomes like the civil servants stand to lose, especially in a country where there is not cost of living allowance.

3. **On Savings and Investments:** inflation discourages savings especially where the interest rates are not indexed to price changes but fixed. As inflation eats through the savings, it makes it not worthwhile to save. Mild inflation encourages investments in productive assets. But when inflation runs out of control, it discourages investments and encourages speculation. Large scale industries cannot be constructed as they take long to be completed and inflation may fail them.

4. **On Money:** rapid inflation reduces the ability of money to perform its major

functions. This means that during rapid inflation money will cease:

- a) to act as a medium of exchange.
 - b) to act as a unit of account.
 - c) to act as a store of value.
 - d) to act as a means of deferred payments
- The major reason for this is that during this time, money loses value very fast.

5. **On balance of payments:** inflation (hyper) discourages production for exports and encourages production of food (especially food that takes short gestation period). The effect of this is further strengthened by the inflation. At the same time governments continue to import the vital commodities on credit since there is a shortage of foreign exchange. The overall result is total import ware over weighing the export value and thus unfavorable balance of payments.
6. **On government Expenditure and Income:** inflation results into a reduction in the government real income from taxes while its expenditures are increasing. If the government fails to make both ends meet, it will be forced to print more money to finance the local deficits in the budget. This further accelerates the rate of inflation.
7. **On employment:** mild inflation encourages increased production; such inflation will encourage increased employment levels. However, since all factor prices do not increase at the same rate and since all sector are not affected equally, rapid inflation may generate unemployment. If wages rise faster than other factor costs,

producers may resort to substituting labour with other relatively cheaper factors.

But what is clear is that during inflation most sectors are declining thus laying off some workers. The morale of workers is also affected due to poor real wages. There are several strikes in industries demanding for higher wages.

Therefore during rapid inflation, disguised unemployment, underemployment, frictional, and voluntary unemployment's are very common.

8. **On Planning:** Once there is rapid inflation, normally planning is made difficult let alone plan implementation. Plans are always undervalued. As they take long to be implemented, they usually fail to take off as the inflation eats through the estimated figures. This involves both private and public plans. The resultant effect is low levels of growth and development.
9. There is a tendency for inflation to promote rural urban migration in LDCs. This is because during this time speculation is best paying and this mainly takes place in urban areas.
10. **On foreign capital:** When there is rapid inflation, there is always a reduction in the inflow of foreign capital. There is also a tendency of a country's citizens moving the foreign exchange to other countries where they feel it is safe and profitable, hence increased outflow of resources.

Measures to Counteract Inflation

Hyper inflation is a menace to continued stability of an economy. This must be

treated as any sickness affecting human life. Government can apply various measures.

It can use one or a package of the following measures:

Fiscal Measures

1. Increase direct taxes.
2. Reduce government expenditure.
3. Increase taxes as well as reducing government expenditure.

Monetary Policies:

1. Increased bank rate.
2. Increased cash and reserve ratios.
3. Open market operations.
4. Special deposits
5. Selective credit control.

It is well observed that whatever its cause, that no inflation can be sustained

without increased money supply. Hence it should be controlled by introduction of restrictive or deflationary fiscal and monetary policies.

Other policies to control inflation:

1. Price controls of especially the consumer goods. However, this is in the short run may cause black markets.
2. Wage controls, this involves government setting up legal wage ceilings.
3. Reduction in workers exorbitant allowances and other in-kind payment which may involve increased government expenditures.

Redressing the sectoral imbalances: bottleneck inflation is a consequence of

sectoral imbalances and rigidities of all sorts to resource shifts among activities as

economic conditions change. It is hence believed that inflation of this nature can

be cured by policies that reduce sectoral imbalances and encourage rapid resource

adjustments. It is advocated that in this situation, government should promote measures that remove bottlenecks which hinder the expansion of potentially expanding sectors.

For example government should encourage increased investments in those sectors providing inputs to the expanding sectors, providing more foreign exchange where it is required, keeping security, give loans, provide transport and also buy from farmers/producers the export products promptly so as to put in more foreign exchange, improve the infrastructures in the country and allow free mobility of necessary and required resources of any kind. Smuggling of important goods out of the country should be stopped.

5. Privatize and liberalize production and trade so as to increase the amount of commodities in the economy which end up reducing the general price level.

However, it should be noted that inflation of any type should be handled with care. There is a tendency of most developing countries to try to control and suppress the existing inflation in their economies at the expense of further development. They enact policies that control the inflation but which are not conducive to national development and growth. The resultant outcome is stagnation of the economy. Careful study of the economy, the variables and how they determine the economic activities are vital cases when anti inflation policies are being made.

What Kenyan Government Has Done To Control Inflation

The government carried out various policies directly and indirectly to try to reduce inflation and control it at a low level. This has been done through the following

measures:

1. Government has reduced taxes on essential commodities both consumer goods and raw materials.
2. Government has improved on the social infrastructures such as roads and communications and this has helped in the easy transportation of commodities from areas of supply to areas of demand.
3. Government has liberalized trade which has led to increase in the supply of commodities in the country.
4. Government has encouraged the establishment and expansion of local industries which have helped in stabilizing the supply of commodities.
5. Government has reduced its borrowing from central bank and encouraged ministries to use their estimated budgets sparingly.
6. Government has continued to save securities to the public such as treasury bills and bonds. These have helped to reduce money in circulation.
7. There has been a deliberate delayed payment by government to government suppliers and this has reduced money in circulation.
8. Government has controlled incomes at low levels of the majority workers especially civil servants and this has affected a purchasing power of the people.
9. Government has reduced its expenditure on various unproductive ventures by privatizing unprofitable investments and also reducing on government labour force.
10. Government has generally encouraged the private sector to increase production by extending financial assistance to them and looking for market for their

commodities.

UNEMPLOYMENT:

Unemployment generally refers to a state/situation where factors of production (resources) are readily available and capable of being utilized at the ruling market returns/rewards but they are either underemployed or completely unengaged.

When referring to labour, unemployment is considered to be a situation where there are people ready, willing and able to work at the going market wage rate but they cannot get jobs. This definition focuses only on those who are involuntarily not employed. It is noteworthy to mention here that all countries suffer unemployment but most developing countries experience it at relatively higher degree, and the following can be some of the causes.

9.2.1 Types and Causes of Unemployment

i. **Transitional unemployment:**

Transitional unemployment is that situation which prevails due to some temporary reasons. The main reason for this type of unemployment are:

ii. **Turnover unemployment:**

Some individuals leave their present jobs and make efforts to secure better ones and in this way, they remain unemployed for some time.

iii. **Casual unemployment:**

Casual workers are employed for a specific job and when the job is completed, such workers become eventually unemployed. E.g. shipping or building construction workers.

iv. **Seasonal unemployment:**

Some industries, for instance have seasonal demand and their produce is manufactured for a specific period of time (a specific period of the year). The workers of such industries remain unemployed for that time e.g. ice factories may remain closed during winter.

v. **Structural unemployment:**

Caused by structural changes such that there exist:

- vi. **Cyclical unemployment:**
During depression, prices are too low and profit margins remain distinctively low. In this case, investment decreases and unemployment increases.
- vii. **Technological unemployment:**
Due to inappropriate technology, Technology is not inappropriate per se but in relation to the environment in which it is applied. In most developing countries, most production structures tend to be labour saving (capital-intensive), which is not appropriate as these countries experience high labour supply. Capital – labour ratios tend to be high in these countries implying that less labour is absorbed compared to capital in production undertakings causing unemployment.
- viii. **Industrial change:**
The establishment of new industries decreases the demand for the products of existing industries e.g. the rapid increase in the demand for Japanese industrial products is one reason for greater unemployment in some European countries.
- ix. **Keynesian unemployment:**
According to Keynesian theory of income and employment, unemployment occurs due to lack of effective demand. If effective demand is less, production of goods and services will fall which will further result in the unemployment of labour. Another feature of Keynesian unemployment is that unemployment of labour is associated with unemployed capital such as plant and machinery which tend to be idle during depression.
- x. **Urban unemployment:**
Due to availability of more facilities in urban areas, more and more people tend to move to these areas. The employment opportunities are not sufficient to absorb all those people who settled in the urban areas. This kind of unemployment is therefore due to rural-urban migration.
- xi. **Disguised unemployment:**
Situation where some people are employed apparently, but if they are withdrawn from this job, total production remains the same. In most developing countries this type of unemployment is estimated at 20 to 30% and measures should be taken to employ such people in other sectors of the economy.
- xii. **Insufficient Capital:**
Shortage of capital is a hindrance in the establishment of more industries and other productive installations, and due to this reason, more employment opportunities are not created.
- xiii. **Nature of education system:**
Education systems for most developing countries are white-collar

oriented, yet the nature of productive capacities of these economies are not sufficiently supportive. Moreover, inadequate education and training facilities render(s) most people unable to secure those job opportunities that require high skills and specialized training.

- xiv. **Rapidly increasing population:** The rate of growth in population exceeds the amount of job opportunities that the economy can generate.

Thus in summary, of the causes of unemployment in developing countries can be said to

include:

- Rapidly increasing population
- Inappropriate technology
- Insufficient capital base
- Demand deficiency/structural changes
- Presence of expatriates
- Education Systems - white-collar orientation
- Rural-urban migration
- One person for more than one job
- Corruption and general mismanagement
- Inadequate knowledge on market opportunities

Cost of Unemployment

Unemployment is a problem because it imposes costs on society and the individual. The cost of unemployment to a nation can be categorized under three headings: the social costs, the cost to the exchequer and the economic cost.

The Social Cost of Unemployment

- i. For the individual, there is the demoralizing effect which can be devastating particularly when they are old. This is because as some job seekers become more and more pessimistic about their chances of finding a job, so their motivation is reduced and their chances of succeeding in finding jobs become even more remote.
- ii. Many of the longer-term unemployed become bored, idle, lose their friends and suffer from depression

- iii. There is also evidence of increased family tension leading in some cases to violence, infidelity, divorce and family breakups.
- iv. Unemployment may also lead to homelessness, as in some circumstances building societies may foreclose on a mortgage if the repayments are not kept up.
- v. Long-term unemployment may also lead to vandalism, football, hooliganism and increases in the crime rate and insecurity in general.

The cost to the exchequer (Ministry of Finance)

- i. There is increasing dependency ratio on the few who are employed in the form of:
- ii. The loss of tax revenues which would otherwise have been received: This consists mostly of lost income tax but also includes lost indirect taxes because of the reduction in spending.
- iii. The loss of national insurance contributions which would otherwise have been received

The economic cost

Unemployment represents a terrible waste of resources and means that the economy is producing a lower rate of output than it could do if there were full employment. This leads to an output gap or the loss of the output of goods and services as a result of unemployment.

REMEDIES FOR UNEMPLOYMENT

The measures appropriate as remedies for unemployment will clearly depend on the type and cause of unemployment. Broadly they can be divided into:

Demand management or demand side policies

Supply side policies.

Demand management policies

These policies are intended to increase aggregate demand and, therefore the equilibrium level of national income. They are sometimes called fiscal and monetary policies. The principal policy instruments are:

Supporting declining industries with public funds

Instituting proper demand management policies that increase aggregate demand including exploiting foreign and regional export markets. This can be done by increasing government expenditure, cutting taxation or expanding the money supply.

Promoting the location of new industries in rural areas which will require an improvement of rural infrastructure.

Supply-side policies

Supply-side policies are intended to increase the economy's potential rate of output by increasing the supply of factor inputs, such as labour inputs and capital inputs, and by increasing productivity. They include:

Increasing information dissemination on market opportunities.

Reversing rural-urban migration by making rural areas more attractive and capable of providing jobs. This particularly is the case in developing countries where rural-non-farm opportunities offer the longest employment opportunities.

Changing attitude towards work i.e. eliminating the white-collar mentality and creating positive attitudes towards agriculture and other technical vocational jobs.

Provision of retraining schemes to keep workers who want to acquire new skills to improve their mobility.

Assistance with family relocation to reduce structural unemployment.

This is done by giving recreational facilities, schools, and the quality

of life in general in other parts of the country even the provision of financial help to cover moving costs and assist with home purchase.

Special employment assistance for teenagers many of them leave school without having studied work-related subjects and with little or no work experience.

Subsidies to firms which reduce working hours rather than the size of the workforce.

Reducing welfare payments to the unemployed. There are many economists who believe that welfare payments have artificially increased the level of unemployment.

Reduction of employee and trade union rights.