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M.A. Final (ECONOMICS)

PAPER - I

MACRO ECONOMICS ANALYSIS

MADHYA PRADESH BHOJ (OPEN) UNIVERSITY
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POST GRADUATE PROGRAMME
M.A. (Final)
Economics

Paper - I
NATIONAL INCOME AND ACCOUNTS

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BLOCK : I

Micro Economic Analysis



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BLOCK : I - NATIONAL INCOME AND ACCOUNT

Unit-1 National Income and Accounts

Unit 2 Flow of Funds and Balance of Payments

BLOCK - I

National Income and Accounts

INTRODUCTION

This book provides exhaustive knowledge of Micro Economics studies. All the theories of Economics have been explained with help of suitable examples, tables and diagrams. This book will meet the requirements of students of post graduate studies and the students preparing for various competitive examinations. Attempts have been made to incorporate all latest developments in the field of Economics theory.

This book has been divided into four blocks. First block deals with national income and accounts, flow of funds and balance of payment.

The second block deals with different aspects of Keynesian theory of employment, consumption function, investment function, multiplier, policy measures and investment business cycle. Different models of business cycles and policy matter.

The third block deals with theory of money, classical approaches to demand for money, money supply and its determinants, different models of value determination, post Keynesian approach to demand for money.

Fourth block deals with supply of money, approaches and theories of money supply, determinants of demand for money supply, federal reserve system, theory of inflation.

BLOCK 1

NATIONAL INCOME AND ACCOUNTS

The block opens with introduction to national income and accounts. The first unit deals with the explanation of what actually term National income accounts stand for. Circular flow of income is explained and its two sector model, three sector model, four sector models and five sector models are discussed in detail. The income and output approach of national income accounting is dealt in later section followed by the concepts of social accounting.

The second unit covers flow of fund approach to national income accounting and balance of payments. Flow of funds approach is introduced with its methods and applications. Cash flow activities and methods of making cash flow statement are discussed. Balance of Payments concept and history of Balance of Payments issues has been explained. Make up of Balance of Payment sheet is the final concern of the unit.

UNIT 1

NATIONAL INCOME AND ACCOUNTS

Objectives

After studying this unit, you should be able to understand and appreciate:

- The concept national income accounting
- The meaning of circular flow of income.
- Circular flow of income in two, three, four and five sector model
- Input and output method and social accounting approach of national income accounting

Structure

1.1 Introduction

1.2 Circular flow of income

- 1.3 Two sector model
- 1.4 Three sector model
- 1.5 Four sector model
- 1.6 Five sector model
- 1.7 National income accounting
- 1.8 The income and output approach
- 1.9 Social accounting
- 1.10 Summary
- 1.11 Further readings

1.1 INTRODUCTION

National income accounting deals with the aggregate measure of the outcome of economic activities. The most common measure of the aggregate production in an economy is Gross Domestic Product (GDP). It is the market value of all final goods and services produced in an economy within a given period of time (typically a year), whether or not those goods are sold to the final consumer. It does not matter who owns the resources as long as it is contained within the geographical border of a country. What is happening to the GDP of a country over time is an important indicator of how well the economy is performing.

Calculating GDP involves adding together trillions of different goods and services produced by the economy. Computation of GDP focuses on transactions involving final output of goods and services produced in the current year.

Transactions involving intermediate goods are not included since their values are reflected in the values of the final goods in whose production the intermediate goods were employed. For example, if there is a firm that sells tires to a car manufacturer, GDP does not include the values of the tires and the full cars separately for this will unnecessarily count the tires twice. We either include the net value added by each firm or just add the value of only the final goods. To illustrate this concept further, consider the tires and the cars that were sold. The tires cost \$100 each to manufacture thus totaling \$400 for a car. The manufacturer sold the tires to Dodge who used them to make a car. A dealership then sold the car for \$10,000. Would the GDP equal \$10,400 thus including

the tires and the car? No, it would not, because the tires are an intermediate good used to produce the car. In this case, the value added of the tire manufacturer is \$400. The value added of the dealership in selling the car is \$10,000 - \$400 which \$9,600 is. The total value added would then be \$400 + \$9,600 which is \$10,000. Basically, the total of the value added must equal the total of the final goods and services.

1.2 CIRCULAR FLOW OF INCOME

In economics, the term circular flow of income or circular flow refers to a simple economic model which describes the reciprocal circulation of income between producers and consumers. In the circular flow model, the inter-dependent entities of producer and consumer are referred to as "firms" and "households" respectively and provide each other with factors in order to facilitate the flow of income. Firms provide consumers with goods and services in exchange for consumer expenditure and "factors of production" from households.

The circle of money flowing through the economy is as follows: total income is spent (with the exception of "leakages" such as consumer saving), while that expenditure allows the sale of goods and services, which in turn allows the payment of income (such as wages and salaries). Expenditure based on borrowings and existing wealth – i.e., "injections" such as fixed investment – can add to total spending.

In equilibrium (Preston), leakages equal injections and the circular flow stays the same size. If injections exceed leakages, the circular flow grows (i.e., there is economic prosperity), while if they are less than leakages, the circular flow shrinks (i.e., there is a recession).

More complete and realistic circular flow models are more complex. They would explicitly include the roles of government and financial markets, along with imports and exports.

Labor and other "factors of production" are sold on resource markets. These resources, purchased by firms, are then used to produce goods and services. The latter are sold on product markets, ending up in the hands of the households, helping them to supply resources.

In fact, the circular flow model is a fundamental representation of macroeconomic activity among the major players in the economy--consumers, producers, government, and the rest of the world. Different versions of the model sequentially combined the four sectors--household, business, government, and foreign--and the three markets--product, resource, and financial--into increasingly more comprehensive representations of the economy.

Assumptions

The basic circular flow of income model consists of six assumptions:

1. The economy consists of two sectors: households and firms.
2. Households spend all of their income (Y) on goods and services or consumption (C). There is no saving (S).
3. All output (O) produced by firms is purchased by households through their expenditure (E).
4. There is no financial sector.
5. There is no government sector.
6. There is no overseas sector.

1.3 TWO SECTOR MODEL

In the simple two sector circular flow of income model the state of equilibrium is defined as a situation in which there is no tendency for the levels of income (Y), expenditure (E) and output (O) to change, that is:

$$Y = E = O$$

This means that the expenditure of buyers (households) becomes income for sellers (firms). The firms then spend this income on factors of production such as labour, capital and raw materials, "transferring" their income to the factor owners. The factor owners spend this income on goods which leads to a circular flow of income.

The basic model illustrates the interaction between the household and business sectors through the product and resource markets. However, more realistic circular flow models include saving, investment, and investment borrowing enabled by the financial markets; taxes and expenditures of the government sector; and imports and exports of the foreign sector.

The prime conclusion of the circular flow model is that the overall volume of the circular flow is largely unaffected by the path taken. In particular, household income can be used for consumption, saving, or taxes. The income diverting away from consumption and to saving or taxes does not disappear, but is used to finance investment by business sector and purchases by the government sector.

1.4 THREE SECTOR MODEL

The three-sector, three-market circular flow model highlights the key role that the government sector plays in the macroeconomy. It expands the circular flow model by illustrating how taxes are diverted from consumption expenditures to the government sector and then used for government purchases. It illustrates that taxes do not vanish from the economy, but are merely diverted.

1.4.1 Three Sectors, Three Markets

The three macroeconomic sectors included in this model are:

- **Household Sector:** This includes everyone, all people, seeking to satisfy unlimited wants and needs. This sector is responsible for consumption expenditures. It also owns all productive resources.
- **Business Sector:** This includes the institutions (especially proprietorships, partnerships, and corporations) that undertake the task of combining resources to produce goods and services. This sector does the production. It also buys capital goods with investment expenditures.
- **Government sector:** This includes the ruling bodies of the federal, state, and local governments. Regulation is the prime function of the government sector, especially passing laws, collecting taxes, and forcing the other sectors to do what they would not do voluntary. It buys a portion of gross domestic product as government purchases.

The three macroeconomic markets in this version of the circular flow are:

- **Product markets:** This is the combination of all markets in the economy that exchange final goods and services. It is the mechanism that exchanges gross domestic product. The full name is aggregate product markets, which is also shortened to the aggregate market.

- Resource markets: This is the combination of all markets that exchange the services of the economy's resources, or factors of production--including, labor, capital, land, and entrepreneurship. Another name for this is factor markets.
- Financial Markets: The commodity exchanged through financial markets is legal claims. Legal claims represent ownership of physical assets (capital and other goods). Because the exchange of legal claims involves the counter flow of income, those seeking to save income buy legal claims and those wanting to borrow income sell legal claims.

1.4.2 SPOTLIGHT ON THE GOVERNMENT SECTOR

The three-sector, three-market circular flow model highlights the role played by the government sector. The government sector buys a portion of gross domestic product flowing through the product markets to pursue its assorted tasks and functions, such as national defense, education, and judicial system. These expenditures are primarily financed from taxes collected from the household sector. However, when tax revenue falls short of expenditures, the government sector is also prone to borrow through the financial markets.

The government sector, as such, adds three key flows to the model--taxes, government purchases, and government borrowing. These flows divert, but do not destroy, a portion of the core flow of production, income, and consumption.

1.4.3 Taxing and Spending and Borrowing

This diagram presents the three-sector, three-market circular flow. At the far left is the household sector, which contains people seeking consumption. At the far right is the business sector that does the production. At the top is the product markets that exchange final goods and services. At the bottom is the resource markets that exchange the services of the scarce resources. Just above the resource markets are the financial markets that divert saving to investment expenditures. In the very center is the government sector.

- Taxes: With the government sector in place, the next step in the construction of the three-sector, three-market circular flow is taxes. Taxes are household sector income that is diverted to the government sector. The household sector is forced

to divert part of income away from consumption and saving because the government sector mandates that they must. Click the [Taxes] button to reveal the flow of taxes from the household sector to the government sector.

- **Government Purchases:** The primary reason that the government sector collects taxes from the household sector is to pay for government purchases. Government purchases by the government sector then become the third basic expenditure on gross domestic product that flows through the product markets. Click the [Purchases] button to highlight this flow from the business sector to the product markets.
- **Government Borrowing:** Taxes are not the only source of income used to finance government purchases (which often happens). When taxes fall short of government purchases, the difference is made up with government borrowing. The government sector, like the business sector, often sells legal claims as a means of borrowing the income that can be used for government purchases. Click the [Borrowing] button to highlight this flow from the financial markets to the government sector.

Combining all three flows indicates the key role played by the government sector. Taxes flow from the household sector to the government sector. This flow then heads to the product markets as government purchases where it is supplemented with borrowing from financial markets. Income diverted away from consumption expenditures by the household sector as taxes finds its way back to the product markets as government purchases by the government sector.

The key to the addition of the government sector to the circular flow is that taxes do NOT disappear as they move from sector to sector, they are merely diverted. In other words, taxes do not remain in the government sector, but merely pass through on the way to the product markets.

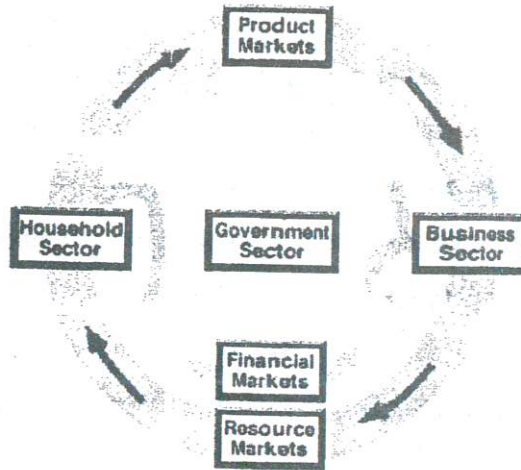


Figure 1 taxing and borrowings

1.4.4 What It All Means

What happens when the government sector is included in the circular flow model?

- First, the government diverts a portion of the circular flow. But this diversion that does not necessarily change the total amount of gross domestic product, factor payments, or national income. It merely diverts income from consumption and saving to taxes. And it diverts gross domestic product from consumption and investment to government purchases.
- Second, the total flow of government purchases is as important, if not more so, than the source of financing. If the government sector spends a trillion on government purchases, this must be paid for with national income, either through taxes or saving. If borrowing declines and purchases remain unchanged, then taxes must rise. If taxes decline and purchases remain unchanged, then borrowing must rise.
- Third, although the total flow is unchanged, shifting income between taxes, consumption, and saving can and does affect the economy. If the tax flow increases, then less remains for consumption and saving. Either the household sector satisfies fewer wants and needs or the business sector borrows less to invest in growth-promoting capital goods. Diverting income to government purchases and away from investment is termed the crowding-out effect, and worries people concerned about big government.

- Fourth, while the size of government is important, so too are specific government purchases. Government spending can be wasteful and unneeded, or it can provide valued goods, including national defense, education, transportation systems, police and fire protection, the judicial system, and environmental quality. In some cases, household consumption and business investment are more valuable than government purchases. In other cases, government purchases are more valuable.

1.5 FOUR SECTOR MODEL

The four-sector, three-market circular flow model highlights the key role that the foreign sector plays in the economy. It expands the circular flow model by illustrating how exports add to, and imports subtract from, the domestic flow of production and income. This is the "complete" model containing all four sectors and all three markets.

1.5.1 Four Sectors, Three Markets

The four macroeconomics sectors included in this model are:

- Household Sector: This includes everyone, all people, seeking to satisfy unlimited wants and needs. This sector is responsible for consumption expenditures. It also owns all productive resources.
- Business Sector: This includes the institutions (especially proprietorships, partnerships, and corporations) that undertake the task of combining resources to produce goods and services. This sector does the production. It also buys capital goods with investment expenditures.
- Government sector: This includes the ruling bodies of the federal, state, and local governments. Regulation is the prime function of the government sector, especially passing laws, collecting taxes, and forcing the other sectors to do what they would not do voluntarily. It buys a portion of gross domestic product as government purchases.
- Foreign sector: This includes everyone and everything (households, businesses, and governments) beyond the boundaries of the domestic economy. It buys exports produced by the domestic economy and produces imports purchased by the domestic economy, which are commonly combined as net exports.

The three macroeconomic markets in this version of the circular flow are:

- **Product markets:** This is the combination of all markets in the economy that exchange final goods and services. It is the mechanism that exchanges gross domestic product. The full name is aggregate product markets, which is also shortened to the aggregate market.
- **Resource markets:** This is the combination of all markets that exchange the services of the economy's resources, or factors of production--including, labor, capital, land, and entrepreneurship. Another name for this is factor markets.
- **Financial Markets:** The commodity exchanged through financial markets is legal claims. Legal claims represent ownership of physical assets (capital and other goods). Because the exchange of legal claims involves the counter flow of income, those seeking to save income buy legal claims and those wanting to borrow income sell legal claims.

1.5.2 Spotlight on the Foreign Sector

The four-sector, three-market circular flow model highlights the role played by the foreign sector. The foreign sector not only buys a portion of gross domestic product flowing through the product markets as exports, it also sells production to the three domestic sectors as imports.

The foreign sector, as such, adds two flows to the model--exports and imports. These two flows are often combined into a single flow--net exports. Unlike other flows, exports and imports can actually change the total volume of the circular flow of production and income.

1.5.3 Exports and Imports

This diagram presents the four-sector, three-market circular flow. At the far left is the household sector, which contains people seeking consumption. At the far right is the business sector that does the production. Near the top is the product markets that exchange final goods and services. At the bottom is the resource markets that exchange the services of the scarce resources. Just above the resource markets are the financial markets that divert saving to investment expenditures. In the very center is the government sector. And at the very top, above the product markets are the foreign sector.

- Exports: With the foreign sector in place, the next step in the construction of the four-sector, three-market circular flow is exports. Exports are goods produced by the domestic economy and purchased by the foreign sector. Exports are represented by a flow from the foreign sector to the core domestic flow. This is the flow of payments into the domestic economy in exchange for the physical flow of goods from the domestic economy. Click the [Exports] button to highlight the flow of exports between the domestic economy and the foreign sector.
- Imports: Imports are goods produced by the foreign sector that are purchased by the three domestic sectors. Imports are represented by a flow from the core domestic flow to the foreign sector. This is the flow of payments out of the domestic economy in exchange for the physical flow of goods into the domestic economy. Click the [Imports] button to reveal the flow of imports between the domestic economy and the foreign sector.

Combining both flows indicates the key role played by the foreign sector. Imports reduce the total flow of the domestic economy and exports expand the total flow of the domestic economy.

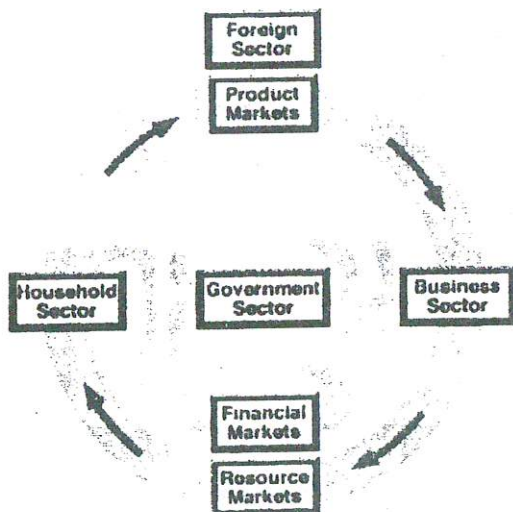


Figure 2 exports and imports

1.5.4 What It All Means

What happens when the foreign sector is included in the circular flow model?

- First, unlike the addition of financial markets and the government sector which merely divert the domestic flow of production and income, the foreign sector can actually change the total volume of the domestic flow. In particular, if exports exceed imports, then the circular flow, in total, is bigger. If the total flow is bigger, then factor payments are bigger, and national income is bigger, and there is more income available for consumption expenditures, saving, taxes, investment expenditures, and government purchases. If imports exceed exports, then the opposite occurs. The total flow is smaller and less income is available for consumption expenditures, saving, taxes, investment expenditures, and government purchases.
- Second, the impact that exports and imports have on the total volume of the domestic flow indicates why domestic politicians, business leaders, and the general population are perpetually preoccupied with foreign trade, especially promoting exports and restricting imports. The circular flow model indicates that exporting more and importing less does in fact boost the domestic flow, which translates into a higher domestic standard of living.

1.6 FIVE SECTOR MODEL

The five sector model of the circular flow of income is a more realistic representation of the economy. Unlike the two sectors model where there are six assumptions the five sector circular flow relaxes all six assumptions. Since the first assumption is relaxed there are three more sectors introduced. The first is the Financial Sector that consists of banks and non-bank intermediaries who engage in the borrowing (savings from households) and lending of money. In terms of the circular flow of income model the leakage that financial institutions provide in the economy is the option for households to save their money. This is a leakage because the saved money can not be spent in the economy and thus is an idle asset that means not all output will be purchased. The injection that the financial sector provides into the economy is investment (I) into the business/firms sector. An example of a group in the finance sector includes banks such as Westpac or financial institutions such as Suncorp.

The next sector introduced into the circular flow of income is the Government Sector that consists of the economic activities of local, state and federal governments. The leakage that the Government sector provides is through the collection of revenue through Taxes (T) that is provided by households and firms to the government. For this reason they are a leakage because it is a leakage out of the current income thus reducing the expenditure on current goods and services. The injection provided by the government sector is Government spending (G) that provides collective services and welfare payments to the community. An example of a tax collected by the government as a leakage is income tax and an injection into the economy can be when the government redistributes this income in the form of welfare payments that is a form of government spending back into the economy.

The final sector in the circular flow of income model is the overseas sector which transforms the model from a closed economy to an open economy. The main leakage from this sector are imports (M), which represent spending by residents into the rest of the world. The main injection provided by this sector is the exports of goods and services which generate income for the exporters from overseas residents. An example of the use of the overseas sector is Australia exporting wool to China; China pays the exporter of the wool (the farmer) therefore more money enters the economy thus making it an injection. Another example is China processing the wool into items such as coats and Australia importing the product by paying the Chinese exporter; since the money paying for the coat leaves the economy it is a leakage.

In terms of the five sectors circular flow of income model the state of equilibrium occurs when the total leakages are equal to the total injections that occur in the economy.

This can be shown as:

$$\text{Savings} + \text{Taxes} + \text{Imports} = \text{Investment} + \text{Government Spending} + \text{Exports}$$

OR

$$S + T + M = I + G + X.$$

This can be further illustrated through the fictitious economy of Noka where:

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

$$\$100 + \$150 + \$50 = \$50 + \$100 + \$150$$

$$\$300 = \$300$$

Therefore since the leakages are equal to the injections the economy is in a stable state of equilibrium. This state can be contrasted to the state of disequilibrium where unlike that of equilibrium the sum of total leakages does not equal the sum of total injections. By giving values to the leakages and injections the circular flow of income can be used to show the state of disequilibrium. Disequilibrium can be shown as:

$$S + T + M \neq I + G + X$$

Therefore it can be shown as one of the below equations where:

Total leakages > Total injections

$$\$150 (S) + \$250 (T) + \$150 (M) > \$75 (I) + \$200 (G) + 150 (X)$$

Or

Total Leakages < Total injections

$$\$50 (S) + \$200 (T) + \$125 (M) < \$75 (I) + \$200 (G) + 150 (X)$$

The effects of disequilibrium vary according to which of the above equations they belong to.

If $S + T + M > I + G + X$ the levels of income, output, expenditure and employment will fall causing a recession or contraction in the overall economic activity. But if $S + T + M < I + G + X$ the levels of income, output, expenditure and employment will rise causing a boom or expansion in economic activity.

To manage this problem, if disequilibrium were to occur in the five sector circular flow of income model, changes in expenditure and output will lead to equilibrium being regained. An example of this is if:

$S + T + M > I + G + X$ the levels of income, expenditure and output will fall causing a contraction or recession in the overall economic activity. As the income falls (Figure 4) households will cut down on all leakages such as saving, they will also pay less in taxation and with a lower income they will spend less on imports. This will lead to a fall in the leakages until they equal the injections and a lower level of equilibrium will be the result.

The other equation of disequilibrium, if $S + T + M < I + G + X$ in the five sector model the levels of income, expenditure and output will greatly rise causing a boom in economic activity. As the household income increases there will be a higher opportunity to save therefore saving in the financial sector will increase, taxation for the higher

threshold will increase and they will be able to spend more on imports. In this case when the leakages increase they will continue to rise until they are equal to the level injections. The end result of this disequilibrium situation will be a higher level of equilibrium.

1.7 NATIONAL INCOME ACCOUNTING

A variety of measures of national income and output are used in economics to estimate total economic activity in a country or region, including gross domestic product (GDP), gross national product (GNP), and net national income (NNI). All are concerned with counting the total amount of goods and services produced within some "boundary". The boundary may be defined climatologically, or by citizenship; and limits on the type of activity also form part of the conceptual boundary; for instance, these measures are for the most part limited to counting goods and services that are exchanged for money: production not for sale but for barter, for one's own personal use, or for one's family, is largely left out of these measures, although some attempts are made to include some of those kinds of production by imputing monetary values to them.

As can be imagined, arriving at a figure for the total production of goods and services in a large region like a country entails an enormous amount of data-collection and calculation. Although some attempts were made to estimate national incomes as long ago as the 17th century, the systematic keeping of national accounts, of which these figures are a part, only began in the 1930s, in the United States and some European countries. The impetus for that major statistical effort was the Great Depression and the rise of Keynesian economics, which prescribed a greater role for the government in managing an economy, and made it necessary for governments to obtain accurate information so that their interventions into the economy could proceed as much as possible from a basis of fact.

In order to count a good or service it is necessary to assign some value to it. The value that all of the measures discussed here assign to a good or service is its market value – the price it fetches when bought or sold. No attempt is made to estimate the actual usefulness of a product – its use-value – assuming that to be any different from its market value.

Three strategies have been used to obtain the market values of all the goods and services produced: the product (or output) method, the expenditure method, and the income method. The product method looks at the economy on an industry-by-industry basis. The total output of the economy is the sum of the outputs of every industry. However, since an output of one industry may be used by another industry and become part of the output of that second industry, to avoid counting the item twice we use, not the value output by each industry, but the value-added; that is, the difference between the value of what it puts out and what it takes in. The total value produced by the economy is the sum of the values-added by every industry.

The expenditure method is based on the idea that all products are bought by somebody or some organisation. Therefore we sum up the total amount of money people and organisations spend in buying things. This amount must equal the value of everything produced. Usually expenditures by private individuals, expenditures by businesses, and expenditures by government are calculated separately and then summed to give the total expenditure. Also, a correction term must be introduced to account for imports and exports outside the boundary.

The income method works by summing the incomes of all producers within the boundary. Since what they are paid is just the market value of their product, their total income must be the total value of the product. Wages, proprietor's incomes, and corporate profits are the major subdivisions of income.

The names of all of the measures discussed here consist of one of the words "Gross" or "Net", followed by one of the words "National" or "Domestic", followed by one of the words "Product", "Income", or "Expenditure". All of these terms can be explained separately.

"Gross" means total product, regardless of the use to which it is subsequently put. "Net" means "Gross" minus the amount that must be used to offset depreciation – i.e., wear-and-tear or obsolescence of the nation's fixed capital assets. "Net" gives an indication of how much product is actually available for consumption or new investment. "Domestic" means the boundary is geographical: we are counting all goods and services produced within the country's borders, regardless of by whom." "National" means the boundary is defined by citizenship (nationality). We count all goods and services

produced by the nationals of the country (or businesses owned by them) regardless of where that production physically takes place.

The output of a French-owned cotton factory in Senegal counts as part of the Domestic figures for Senegal, but the National figures of France. "Product", "Income", and "Expenditure" refer to the three counting methodologies explained earlier: the product, income, and expenditure approaches. However the terms are used loosely. "Product" is the general term, often used when any of the three approaches was actually used. Sometimes the word "Product" is used and then some additional symbol or phrase to indicate the methodology; so, for instance, we get "Gross Domestic Product by income", "GDP (income)", "GDP(I)", and similar constructions. "Income" specifically means that the income approach was used. "Expenditure" specifically means that the expenditure approach was used.

Note that all three counting methods should in theory give the same final figure. However, in practice minor differences are obtained from the three methods for several reasons, including changes in inventory levels and errors in the statistics. One problem for instance is that goods in inventory have been produced (therefore included in Product), but not yet sold (therefore not yet included in Expenditure). Similar timing issues can also cause a slight discrepancy between the value of goods produced (Product) and the payments to the factors that produced the goods (Income), particularly if inputs are purchased on credit, and also because wages are collected often after a period of production.

The statistics for Gross Domestic Product (GDP) are computed as part of the National Income and Product Accounts. This national accounting system, developed during the 1940s and 1950s, is the most ambitious collection of economic data by the United States government and is the source of much of the information we have about the economy. Like business accounting, national-income accounting uses a double-entry approach. Because each transaction has two sides, involving both a sale and a purchase, there are two ways to divide up GDP. One can look at the expenditures for output, or one can look at the incomes that the production of output generates.

Let us look at how this double-entry system works. Suppose you are a computer programmer who creates a game that you distribute over the internet. You have no costs

of packaging--you only input is your skill and time as a programmer. Lots of teenagers buy your game and you earn \$50,000 dollars for the year. You have produced something of value. How should we account for this production?

The double-entry system says that the expenditures made on the product, which is the source of funds to the producer, should equal the uses of funds by the producer, which are the incomes that flow from production. Because ordinary people bought this game, the expenditures made are by households. They are called **consumption** expenditures. We will increase them by \$50,000. You pay yourself, but is what you earn wages or profit? For an unincorporated business there is a special category for earnings called **proprietors' income**, and it will increase by \$50,000

Expenditures Made on Output (Source of Funds)	Incomes Generated in Production (Uses of Funds)
Consumption \$50000	Proprietors' Income \$50000

Suppose instead that you incorporate yourself as a business and your product is educational software sold only to public schools. What will change? The expenditures are no longer consumption because they are not made by the household sector. There are three other sectors of the economy used in national income accounting: government, business, and the rest of the world. Public schools are an important part of the government, so now these sales will be classified as **government expenditures**. Since you are incorporated, you will have to file a tax form that separates wages from your profit. Suppose you tell the IRS that you paid yourself \$40,000 and that the profit of your business was \$10,000. On the Income side of the accounts, **employee compensation** goes up \$40,000 and **corporate profits** go up \$10,000.

Expenditures Made on Output (Source of Funds)	Incomes Generated in Production (Uses of Funds)
Government Spending \$50000	Employee Compensation \$40000 Corporate Profit \$10000

Finally, suppose you retire and receive \$15,000 per year from Social Security. What will we do in this case? The answer is, "Nothing," because nothing has been produced. This income is a **transfer payment**. It was taken from someone through taxes

(euphemistically called a contribution in the case of Social Security, but there was nothing voluntary about it) and given to you. In an exchange, both parties must give to get. In a transfer, one party gives and the other gets--no service or product is returned to the giving party.

1.7.1 Who Gets GDP?

The national income and product accounts have four groups that use production. The table below shows that in the United States the largest amount goes to ordinary people and is classified as consumption. The food, the clothes, the medical check up, and the gasoline you buy are all consumption expenditures. The next largest use of output is by the government, including state and local governments in addition to the federal government. This category of government spending includes items such as purchases of military goods, payments to public school teachers, and the salary of your congressman. It may surprise you that in 1990 the expenditures of state and local governments were larger than those of the federal government: \$673.0 million for the former and \$508.4 for the latter. Not included as government expenditures are payments for which no service is expected, such as payment of social security to the elderly. This sort of transaction is classified as a transfer.

U.S. Gross Domestic Product, Selected Years

(Numbers in billions of dollars)

	1933	1960	1990
GDP	56.4	527.4	5803.2
Consumption	45.9	332.3	3831.5
Government Spending	8.7	113.8	1181.4
Investment	1.7	78.9	861.7
Net Exports	.1	2.4	-71.4

Sources: *Survey of Current Business*, August 2001;
www.bea.gov/bea/dn/nipaweb/TableViewFixed.asp, Tables 1.1, 1.9 and 1.14.

The third category, **investment**, includes construction of new factories and the purchase of new machines by businesses. It also includes changes in inventories held by

business and the purchase of new homes by consumers. New homes are considered investment spending because they are long-lived assets that will yield services for many years. On the other hand, purchases of appliances and vehicles by consumers are considered consumption, though these items also have lifetimes much longer than a year. The dividing line between investment and consumption is not clear-cut and sometimes shifts. At one time the purchase of a mobile home was classified as consumption, but it is now classified as investment.

The use of the word "investment" in discussing GDP differs from the use of this word in every day speech. People talk about investing in stocks and bonds, for example, yet purchases of stocks and bonds are not considered investment for purposes of computing GDP. In fact, these transactions are not counted at all because they involve the exchange of existing or new financial instruments, not the purchases of actual output. If you loan company money by buying a newly-issued bond, investment will be affected only if the company uses your money to purchase new capital or to increase inventory. Differences in the way economists use words and the way they are used in everyday conversation are common.

The last group that receives the output that our economy produces is foreigners. To take this group into account, we must add exports to consumption, investment, and government spending. However, some consumption, investment, and government spending is for goods that are produced in other countries, not here. One way to account for these purchases of foreign products would be to adjust consumption, etc. so that they included only the amounts spent on domestic products. However, this is not the way imports are taken into account. They are subtracted from exports to obtain **net exports**. A reason for this procedure is that data for imports as a whole is more reliable than data broken into imported consumption expenditures, imported investment expenditures, and imported government expenditures.

The small numbers for net exports in the table disguises the importance of foreign transactions. In 1990 exports were \$557.2 billion, or about ten per cent of total production, and imports were \$628.6 billion. Because they were similar in size, their difference, net exports, was fairly small.

We can summarize our discussion so far in terms of an equation that you will see again:

$$(1) \text{ GDP} = C + I + G + X_n$$

1.8 THE INCOME AND OUTPUT APPROACH

The output approach focuses on finding the total output of a nation by directly finding the total value of all goods and services a nation produces.

Because of the complication of the multiple stages in the production of a good or service, only the final value of a good or service is included in total output. This avoids an issue often called 'double counting', wherein the total value of a good is included several times in national output, by counting it repeatedly in several stages of production. In the example of meat production, the value of the good from the farm may be \$10, then \$30 from the butchers, and then \$60 from the supermarket. The value that should be included in final national output should be \$60, not the sum of all those numbers, \$100. The values added at each stage of production over the previous stage are respectively \$10, \$20, and \$30. Their sum gives an alternative way of calculating the value of final output.

Formulae:

GDP (gross domestic product) at market price = value of output in an economy in a particular year - intermediate consumption

NNP at factor cost = GDP at market price - depreciation + NFIA (*net factor income from abroad*) - net indirect taxes

The income approach focuses on finding the total output of a nation by finding the total income received by the factors of production owned by that nation.

The main types of income that are included in this approach are rent (the money paid to owners of land), salaries and wages (the money paid to workers who are involved in the production process, and those who provide the natural resources), interest (the money paid for the use of man-made resources, such as machines used in production), and profit (the money gained by the entrepreneur - the businessman who combines these resources to produce a good or service).

Formulae:

NDP at factor cost = compensation of employee + operating surplus + mixed income of self employee

National income = NDP at factor cost + NFIA (net factor income from abroad) – depreciation. The expenditure approach is basically a socialist output accounting method. It focuses on finding the total output of a nation by finding the total amount of money spent. This is acceptable, because like income, the total value of all goods is equal to the total amount of money spent on goods. The basic formula for domestic output combines all the different areas in which money is spent within the region, and then combining them to find the total output is as follows.

$$\text{GDP} = \text{C} + \text{I} + \text{G} + (\text{X} - \text{M})$$

Where:

C = household consumption expenditures / personal consumption expenditures

I = gross private domestic investment

G = government consumption and gross investment expenditures

X = gross exports of goods and services

M = gross imports of goods and services

Note: $(\text{X} - \text{M})$ is often written as X_N , which stands for "net exports"

1.8.1 National income and welfare

GDP per capita (per person) is often used as a measure of a person's welfare. Countries with higher GDP may be more likely to also score highly on other measures of welfare, such as life expectancy. However, there are serious limitations to the usefulness of GDP as a measure of welfare:

- Measures of GDP typically exclude unpaid economic activity, most importantly domestic work such as childcare. This leads to distortions; for example, a paid nanny's income contributes to GDP, but an unpaid parent's time spent caring for children will not, even though they are both carrying out the same economic activity.
- GDP takes no account of the inputs used to produce the output. For example, if everyone worked for twice the number of hours, then GDP might roughly double, but this does not necessarily mean that workers are better off as they would have less leisure time. Similarly, the impact of economic activity on the environment is not measured in calculating GDP.

- Comparison of GDP from one country to another may be distorted by movements in exchange rates. Measuring national income at purchasing power parity may overcome this problem at the risk of overvaluing basic goods and services, for example subsistence farming.
- GDP does not measure factors that affect quality of life, such as the quality of the environment (as distinct from the input value) and security from crime. This leads to distortions - for example, spending on cleaning up an oil spill is included in GDP, but the negative impact of the spill on well-being (e.g. loss of clean beaches) is not measured.
- GDP is the mean (average) wealth rather than median (middle-point) wealth. Countries with a skewed income distribution may have a relatively high per-capita GDP while the majority of its citizens have a relatively low level of income, due to concentration of wealth in the hands of a small fraction of the population. See Gini coefficient.

Because of this, other measures of welfare such as the Human Development Index (HDI), Index of Sustainable Economic Welfare (ISEW), Genuine Progress Indicator (GPI), gross national happiness (GNH), and sustainable national income (SNI) are used.

1.9 SOCIAL ACCOUNTING

Social accounting (also known as social and environmental accounting, corporate social reporting, corporate social responsibility reporting, non-financial reporting, or sustainability accounting) is the process of communicating the social and environmental effects of organisations' economic actions to particular interest groups within society and to society at large.

Social accounting is commonly used in the context of business, or corporate social responsibility (CSR), although any organisation, including NGOs, charities, and government agencies may engage in social accounting.

Social accounting emphasises the notion of corporate accountability. D. Crowther defines social accounting in this sense as "an approach to reporting a firm's activities which stresses the need for the identification of socially relevant behaviour, the

determination of those to whom the company is accountable for its social performance and the development of appropriate measures and reporting techniques."

Social accounting is often used as an umbrella term to describe a broad field of research and practice. The use of more narrow terms to express a specific interest is thus not uncommon. Environmental accounting may e.g. specifically refer to the research or practice of accounting for an organisation's impact on the natural environment. Sustainability accounting is often used to express the measuring and the quantitative analysis of social and economic sustainability

1.9.1 Purpose

Social accounting, a largely normative concept, seeks to broaden the scope of accounting in the sense that it should:

- concern itself with more than only economic events;
- not be exclusively expressed in financial terms;
- be accountable to a broader group of stakeholders;
- broaden its purpose beyond reporting financial success.

It points to the fact that companies influence their external environment (both positively and negatively) through their actions and should therefore account for these effects as part of their standard accounting practices. Social accounting is in this sense closely related to the economic concept of externality.

Social accounting offers an alternative account of significant economic entities. It has the "potential to expose the tension between pursuing economic profit and the pursuit of social and environmental objectives".

The purpose of social accounting can be approached from two different angles, namely for management control purposes or accountability purposes.

1.9.2 Accountability

Social accounting for accountability purposes is designed to support and facilitate the pursuit of society's objectives. These objectives can be manifold but can typically be described in terms of social and environmental desirability and sustainability. In order to make informed choices on these objectives, the flow of information in society in general, and in accounting in particular, needs to cater for democratic decision-making. In

democratic systems, Gray argues, there must then be flows of information in which those controlling the resources provide accounts to society of their use of those resources: a system of corporate accountability.

Society is seen to profit from implementing a social and environmental approach to accounting in a number of ways, e.g.:

- Honoring stakeholders' rights of information;
- Balancing corporate power with corporate responsibility;
- Increasing transparency of corporate activity;
- Identifying social and environmental costs of economic success.

1.9.3 Management control

Social accounting for the purpose of management control is designed to support and facilitate the achievement of an organization's own objectives. Because social accounting is concerned with substantial self-reporting on a systemic level, individual reports are often referred to as social audits.

Organizations are seen to benefit from implementing social accounting practices in a number of ways, e.g.:

- Increased information for decision-making;
- More accurate product or service costing;
- Enhanced image management and Public Relations;
- Identification of social responsibilities;
- Identification of market development opportunities;
- Maintaining legitimacy.

According to BITC the "process of reporting on responsible businesses performance to stakeholders" (i.e. social accounting) helps integrate such practices into business practices, as well as identifying future risks and opportunities.

The management control view thus focuses on the individual organization. Critics of this approach point out that the benign nature of companies is assumed. Here, responsibility, and accountability, is largely left in the hands of the organization concerned.

1.9.4 Scope

Formal accountability

In social accounting the focus tends to be on larger organisations such as multinational corporations (MNCs), and their visible, external accounts rather than informally produced accounts or accounts for internal use. The need for formality in making MNCs accountability is given by the spatial, financial and cultural distance of these organisations to those who are affecting and affected by it. •

Social accounting also questions the reduction of all meaningful information to financial form. Financial data is seen as only one element of the accounting language.

Self-reporting and third party audits

In most countries, existing legislation only regulates a fraction of accounting for socially relevant corporate activity. In consequence, most available social, environmental and sustainability reports are produced voluntarily by organisations and in that sense often resemble financial statements. While companies' efforts in this regard are usually commended, there seems to be a tension between voluntary reporting and accountability, for companies are likely to produce reports favouring their interests.

The re-arrangement of social and environmental data companies already produce as part of their normal reporting practice into an independent social audit is called a **silent or shadow account**.

An alternative phenomenon is the creation of **external social audits** by groups or individuals independent of the accountable organisation and typically without its encouragement. External social audits thus also attempt to blur the boundaries between organisations and society and to establish social accounting as a fluid two-way communication process. Companies are sought to be held accountable regardless of their approval. It is in this sense that external audits part with attempts to establish social accounting as an intrinsic feature of organizational behaviour. The reports of Social Audit Ltd in the 1970s on e.g. Tube Investments, Avon Rubber and Coalite and Chemical, laid the foundations for much of the later work on social audits.

Reporting areas

Unlike in financial accounting, the matter of interest is by definition less clear-cut in social accounting; this is due to an aspired all-encompassing approach to corporate activity. It is generally agreed that social accounting will cover an organisations

relationship with the natural environment, its employees, and wider ethical issues concentrating upon consumers and products, as well as local and international communities. Other issues include corporate action on questions of ethnicity and gender.

Audience

Social accounting supersedes the traditional audit audience, which is mainly composed of a company's shareholders and the financial community, by providing information to all of the organisation's stakeholders. A stakeholder of an organisation is anyone who can influence or is influenced by the organisation. This often includes, but is not limited to, suppliers of inputs, employees and trade unions, consumers, members of local communities, society at large and governments.^[13] Different stakeholders have different rights of information. These rights can be stipulated by law, but also by non-legal codes, corporate values, mission statements and moral rights. The rights of information are thus determined by "society, the organisation and its stakeholders".^[14]

Environmental accounting

Environmental accounting is a subset of social accounting, focuses on the cost structure and environmental performance of a company. It principally describes the preparation, presentation, and communication of information related to an organisation's interaction with the natural environment. Although environmental accounting is most commonly undertaken as voluntary self-reporting by companies, third-party reports by government agencies, NGOs and other bodies posit to pressure for environmental accountability.

Accounting for impacts on the environment may occur within a company's financial statements, relating to liabilities, commitments and contingencies for the remediation of contaminated lands or other financial concerns arising from pollution. Such reporting essentially expresses financial issues arising from environmental legislation. More typically, environmental accounting describes the reporting of quantitative and detailed environmental data within the non-financial sections of the annual report or in separate (including online) environmental reports. Such reports may account for pollution emissions, resources used, or wildlife habitat damaged or re-established.

In their reports, large companies commonly place primary emphasis on eco-efficiency, referring to the reduction of resource and energy use and waste production per unit of product or service. A complete picture which accounts for all inputs, outputs and wastes of the organisation, must not necessarily emerge. Whilst companies can often demonstrate great success in eco-efficiency, their ecological footprint, that is an estimate of total environmental impact, may move independently following changes in output.

Legislation for compulsory environmental reporting exists in some form e.g. in Denmark, Netherlands, Australia and Korea. The United Nations has been highly involved in the adoption of environmental accounting practices, most notably in the United Nations Division for Sustainable Development publication Environmental Management Accounting Procedures and Principles (2002).

1.9.5 Applications

Social accounting is a widespread practice in a number of large organisations in the United Kingdom. Royal Dutch Shell, BP, British Telecom, The Co-operative Bank, The Body Shop, and United Utilities all publish independently audited social and sustainability accounts. In many instances the reports are produced in (partial or full) compliance with the sustainability reporting guidelines set by the Global Reporting Initiative (GRI).

Traidcraft plc, the fair trade organisation, claims to be the first public limited company to publish audited social accounts in the UK, starting in 1993.

The website of the Centre for Social and Environmental Accounting Research contains a collection of exemplary reporting practices and social audits.

1.9.6 Format

Companies and other organisations (such as NGOs) may publish annual corporate responsibility reports, in print or online. The reporting format can also include summary or overview documents for certain stakeholders, a corporate responsibility or sustainability section on its corporate website, or integrate social accounting into its annual report and accounts. Companies may seek to adopt a social accounting format that is audience specific and appropriate. For example, H&M, asks stakeholders how they would like to receive reports on its website; Vodafone publishes separate reports for 11 of

its operating companies as well as publishing an internal report in 2005; Weyerhaeuser produced a tabloid-size, four-page mini-report in addition to its full sustainability report

1.9.7 Social accounting matrix

A Social Accounting Matrix (SAM) represents flows of all economic transactions that take place within an economy (regional or national). It is at the core, a matrix representation of the National Accounts for a given country, but can be extended to include non-national accounting flows, and created for whole regions or area. SAMs refer to a single year providing a static picture of the economy.

The SAM

SAMs are square (columns equal rows) in the sense that all institutional agents (Firms, Households, Government and 'Rest of Economy' sector) are both buyers and sellers. Columns represent buyers (expenditures) and rows represent sellers (receipts). SAM's were created to identify all monetary flows from sources to recipients, within a disaggregated national account. The SAM is read from column to row, so each entry in the matrix comes from its column heading, going to the row heading. Finally columns and rows are added up, to ensure accounting consistency, and each column is added up to equal each corresponding row. In the illustration below for a basic open economy, the item C (consumption) comes from Households and is paid to Firms.

Illustrative Open Economy SAM

	Firm	Household	Government	Rest of Economy	of Net Investment	Total (Received)
Firm		C	G_F	$(X-M)_K$	I	$C+G_F+(X-M)_K+I$
Household	W		G_H	$(X-M)_C$		$W+G_H+(X-M)_C$
Government	T_F	T_H				T_F+T_H
Rest of Economy	$(X-M)_K$	$(X-M)_C$				$(X-M)_K+(X-M)_C$
Net Investment		S_H	S_G			S_H+S_G
Total (Expended)	$W+T_F+(X-M)_K$	$C+T_H+(X-M)_C+S_H$	$G_F+G_H+S_G$	$(X-M)_C+(X-M)_K$	I	

Abbreviations: Capital letters: Taxes, Wages, Imports, Exports, Savings, Investment, Consumption, Government Transfer Subscripts.
Firms, Households, Government, Consumption Goods, K: Capital Goods

SAMs can be easily extended to include other flows in the economy, simply by adding more columns and rows, once the standard national account (SNA) flows have been set up. Often rows for 'capital' and 'labor' are included, and the economy can be disaggregated into any number of sectors. Each extra disaggregated source of funds must have an equal and opposite recipient. So the SAM simplifies the design of the economy being modeled. SAMs are currently in widespread use, and many statistical bureaus, particularly in OECD countries, create both a national account and this matrix counterpart.

SAMs form the backbone of Computable general equilibrium (CGE) Models, various types of empirical multiplier models, and the Input-output model.

Appropriately formatted SAMs depict the spending patterns of an economy, as with IMPLAN and RIMS II data, and can be used in economic impact analysis.

Using a SAM includes the institutional structure assumed in the national accounts into any model. This means that variables and agents are not treated with monetary source-recipient flows in mind, but are rather grouped together in different categories according to the United Nations Standardised National Accounting (SNA) Guidelines. For example, the national accounts usually imputes the value of household investment or home-owner 'rental' income and treats some public sector institutional investment as direct income flows - whereas the SAM is trying to show just the explicit flows of money. Thus the data has to be untangled from its inherent SNA definitions to become money flow variables, and they then have to equal across each row and column, which is a process referred to as 'Benchmarking'.

A theoretical SAM always balances, but empirically estimated SAM's never do in the first collation. This is due to the problem of converting national accounting data into money flows and the introduction of non-SNA data, compounded by issues of inconsistent national accounting data (which is prevalent for many developing nations, while developed nations tend to include a SAM version of the national account, generally precise to within 1% of GDP). This was noted as early as 1984 by Mansur and Whalley,

and numerous techniques have been devised to 'adjust' SAMs, as "inconsistent data estimated with error, [is] a common experience in many countries".

The traditional method of benchmarking a SAM was simply known as the "Row-and-Columns" (RoW) method. One finds an arithmetic average of the total differences between the row and column in question, and adjusts each individual cell until the row and column equal.

Robinson et al. (2001) suggests an improved method for 'adjusting' an unbalanced SAM in order to get all the rows and columns to equal, and gives the example of a SAM created for Mozambique's economy in 1995, where the process of gathering the data, creating the SAM and 'adjusting' it, is thoroughly covered by Arndt et al. (1997). On inspecting the changes made to the Mozambique's 1995 SAM to achieve balance is an adjustment of \$295m USD which meant that \$227m USD was added to the SAM net, just to balance the rows and columns. For 1995 this adjustment is equivalent to 11.65% of GDP! More disconcerting is perhaps the fact that agricultural producers (which according to FAO (1995) employed 85% of the labor force in 1994) were given a \$58m USD pay rise in the SAM, meaning that 10% of agricultural income (equivalent to 5% of GDP) in the SAM was created, out of thin air. In other words, for a country where 38% of the population lived for less than \$1 in the period 1994-2004 (UNICEF 2008), this SAM 'adjustment' added \$4.40 to each persons income in the agricultural sector – more than any of the later trade and tax models using this SAM could arguably hope to achieve.

Activity 1

1. Discuss the term circular flow of income. Explain its various sector models in detail.
2. What do you understand by term national income accounting? How it is helpful in assessing the national growth.
3. What is the income and output approach of national income accounting? Discuss with suitable examples.
4. Write short note on social accounting. Explain how it is associated with environment accounting?

1.10 SUMMARY

In this unit various aspects related to national income and accounts are discussed. National Income Accounting is explained as it is used to determine the level of economic activity of a country. Two methods are used and the results reconciled the expenditure approach sums what has been purchased during the year and the income approach sums what has been earned during the year. Similarly GDP is the sum of all the final goods and services produced by the residents of a country in one year. Circular flow of income is explained with its two, three, four and five sector models. In the later section various approaches of National Income accounting including social accounting and input output accounting are described in detail.

1.11 FURTHER READINGS

- Charnes, A., C. Colantoni, W. W. Cooper and K. O. Kortanek. 1972. Economic social and enterprise accounting and mathematical models. The Accounting Review (January)
- Livingstone, J. L. 1968. Matrix algebra and cost allocation. The Accounting Review (July)
- Whalen, J. M. 1962. Adding performance control to cost control. N.A.A. Bulletin (August)
- Gray R.H., D.L. Owen & C. Adams (1996) Accounting and Accountability: Changes and Challenges in Corporate Social and Environmental Reporting (London: Prentice Hall)

UNIT 2

FLOW OF FUNDS AND BALANCE OF PAYMENTS

Objectives

After studying this unit, you should be able to understand:

- The concept and approach to flow of funds in national income accounting
- Various activities and methods involved in cash flow statements.
- The meaning and definition of term Balance of Payments.
- The history of balance of payments since its very beginning stages.
- The method of making balance of payment sheet.

Structure

2.1 Introduction to approaches towards flow of funds.

2.2 Cash flow activities

2.3 Balance of Payments

2.4 History of Balance of Payments issues

2.5 Make up of Balance of Payment sheet.

2.6 Summary

2.7 Further readings

2.1 INTRODUCTION TO APPROACHES TOWARDS FLOW OF FUNDS

Cash basis financial statements were common before accrual basis financial statements. The "flow of funds" statements of the past were cash flow statements.

In the United States in 1971, the Financial Accounting Standards Board (FASB) defined rules that made it mandatory under Generally Accepted Accounting Principles (US GAAP) to report sources and uses of funds, but the definition of "funds" was not clear." Net working capital" might be cash or might be the difference between current assets and current liabilities. From the late 1970 to the mid-1980s, the FASB discussed the usefulness of predicting future cash flows. In 1987, FASB Statement No. 95 (FAS 95) mandated that firms provide cash flow statements. In 1992, the International Accounting

Standards Board issued International Accounting Standard 7 (IAS 7), *Cash Flow Statements*, which became effective in 1994, mandating that firms provide cash flow statements.

US GAAP and IAS 7 rules for cash flow statements are similar. Differences include:

- IAS 7 requires that the cash flow statement include changes in both cash and cash equivalents. US GAAP permits using cash alone or cash and cash equivalents.
- IAS 7 permits bank borrowings (overdraft) in certain countries to be included in cash equivalents rather than being considered a part of financing activities.
- IAS 7 allows interest paid to be included in operating activities or financing activities. US GAAP requires that interest paid be included in operating activities.
- US GAAP (FAS 95) requires that when the direct method is used to present the operating activities of the cash flow statement, a supplemental schedule must also present a cash flow statement using the indirect method. The IASC strongly recommends the direct method but allows either method. The IASC considers the indirect method less clear to users of financial statements. Cash flow statements are most commonly prepared using the indirect method, which is not especially useful in projecting future cash flows.

2.2 CASH FLOW ACTIVITIES

The cash flow statement is partitioned into three segments, namely: cash flow resulting from operating activities, cash flow resulting from investing activities, and cash flow resulting from financing activities.

The money coming into the business is called cash inflow, and money going out from the business is called cash outflow.

Cash flow refers to the movement of cash into or out of a business, a project, or a financial product. It is usually measured during a specified, finite period of time.

Measurement of cash flow can be used

- To determine a project's rate of return or value. The time of cash flows into and out of projects are used as inputs in financial models such as internal rate of return, and net present value.

- To determine problems with a business's liquidity. Being profitable does not necessarily mean being liquid. A company can fail because of a shortage of cash, even while profitable.
- As an alternate measure of a business's profits when it is believed that accrual accounting concepts do not represent economic realities. For example, a company may be notionally profitable but generating little operational cash (as may be the case for a company that barter its products rather than selling for cash). In such a case, the company may be deriving additional operating cash by issuing shares, or raising additional debt finance.
- Cash flow can be used to evaluate the 'quality' of Income generated by accrual accounting. When Net Income is composed of large non-cash items it is considered low quality.
- To evaluate the risks within a financial product. E.g. matching cash requirements, evaluating default risk, re-investment requirements, etc.

Cash flow is a generic term used differently depending on the context. It may be defined by users for their own purposes. It can refer to actual past flows, or to projected future flows. It can refer to the total of all the flows involved or to only a subset of those flows. Subset terms include 'net cash flow', operating cash flow and free cash flow.

Statement of cash flow in a business's financials

The (total) net cash flow of a company over a period (typically a quarter or a full year) is equal to the change in cash balance over this period: positive if the cash balance increases (more cash becomes available), negative if the cash balance decreases. The total net cash flow is the sum of cash flows that are classified in three areas:

1. Operational cash flows: Cash received or expended as a result of the company's internal business activities. It includes cash earnings plus changes to working capital. Over the medium term this must be net positive if the company is to remain solvent.
2. Investment cash flows: Cash received from the sale of long-life assets, or spent on capital expenditure (investments, acquisitions and long-life assets).
3. Financing cash flows: Cash received from the issue of debt and equity, or paid out as dividends, share repurchases or debt repayments.

Ways Companies Can Augment Reported Cash Flow

Common methods include:

- Sales - Sell the receivables to a factor for instant cash. (leading)
- Inventory - Don't pay your suppliers for an additional few weeks at period end. (lagging)
- Sales Commissions - Management can form a separate (but unrelated) company and act as its agent. The book of business can then be purchased quarterly as an investment.
- Wages - Remunerate with stock options.
- Maintenance - Contract with the predecessor company that you prepay five years worth for them to continue doing the work
- Equipment Leases - Buy it
- Rent - Buy the property (sale and lease back, for example).
- Oil Exploration costs - Replace reserves by buying another company's.
- Research & Development - Wait for the product to be proven by a start-up lab; then buy the lab.
- Consulting Fees - Pay in shares from treasury since usually to related parties
- Interest - Issue convertible debt where the conversion rate changes with the unpaid interest.
- Taxes - Buy shelf companies with TaxLossCarryForward's. Or gussy up the purchase by buying a lab or O&G explore co. with the same TLCF.^[1]

Examples

Description	Amount (\$)	totals (\$)
Cash flow from operations		+10
Sales (paid in cash)	+30	
Materials	-10	
Labor	-10	
Cash flow from financing		+40
Incoming loan	+50	

Loan repayment	-5
Taxes	-5
Cash flow from investments	-10
Purchased capital	-10
Total	+40

The net cash flow only provides a limited amount of information. Compare, for example, the cash flows over three years of two companies:

	Company A			Company B		
	Year 1	Year 2	Year 3	Year 1	Year 2	Year 3
Cash flow from operations	+20M	+21M	+22M	+10M	+11M	+12M
Cash flow from financing	+5M	+5M	+5M	+5M	+5M	+5M
Cash flow from investment	-15M	-15M	-15M	0M	0M	0M
Net cash flow	+10M	+11M	+12M	+15M	+16M	+17M

Company B has a higher yearly cash flow. However, Company A is actually earning more cash by its core activities and has already spent 45M in long term investments, of which the revenues will only show up after three years.

Cash flow statement

In financial accounting, a **cash flow statement**, also known as *statement of cash flows* or *funds flow statement*, is a financial statement that shows how changes in balance sheet accounts and income affect cash and cash equivalents, and breaks the analysis down to operating, investing, and financing activities. Essentially, the cash flow statement is concerned with the flow of cash in and cash out of the business. The statement captures both the current operating results and the accompanying changes in the balance sheet. As an analytical tool, the statement of cash flows is useful in determining the short-term viability of a company, particularly its ability to pay bills. International Accounting Standard 7 (IAS 7), is the International Accounting Standard that deals with cash flow statements.

People and groups interested in cash flow statements include:

- Accounting personnel, who need to know whether the organization will be able to cover payroll and other immediate expenses
- Potential lenders or creditors, who want a clear picture of a company's ability to repay
- Potential investors, who need to judge whether the company is financially sound
- Potential employees or contractors, who need to know whether the company will be able to afford compensation
- Shareholders of the business

Purpose

Statement of Cash Flow - Simple Example

for the period 01/01/2006 to 12/31/2006

Cash flow from operations	\$4,000
Cash flow from investing	\$(1,000)
Cash flow from financing	\$(2,000)
Net cash flow	\$1,000

Parentheses indicate negative values

The cash flow statement was previously known as the **flow of funds statement**.^[2]

The cash flow statement reflects a firm's liquidity.

The balance sheet is a snapshot of a firm's financial resources and obligations at a single point in time, and the income statement summarizes a firm's financial transactions over an interval of time. These two financial statements reflect the accrual basis accounting used by firms to match revenues with the expenses associated with generating those revenues. The cash flow statement includes only inflows and outflows of cash and cash equivalents; it excludes transactions that do not directly affect cash receipts and payments. These noncash transactions include depreciation or write-offs on bad debts or credit losses to name a few. The cash flow statement is a cash basis report on three types of financial activities: operating activities, investing activities, and financing activities. Noncash activities are usually reported in footnotes.

The cash flow statement is intended to

1. provide information on a firm's liquidity and solvency and its ability to change cash flows in future circumstances
2. provide additional information for evaluating changes in assets, liabilities and equity
3. improve the comparability of different firms' operating performance by eliminating the effects of different accounting methods
4. indicate the amount, timing and probability of future cash flows

The cash flow statement has been adopted as a standard financial statement because it eliminates allocations, which might be derived from different accounting methods, such as various timeframes for depreciating fixed assets.

2.2.1 Operating activities

Operating activities include the production, sales and delivery of the company's product as well as collecting payment from its customers. This could include purchasing raw materials, building inventory, advertising, and shipping the product.

Under IAS 7, operating cash flows include:

- Receipts from the sale of goods or services
- Receipts for the sale of loans, debt or equity instruments in a trading portfolio
- Interest received on loans
- Dividends received on equity securities
- Payments to suppliers for goods and services
- Payments to employees or on behalf of employees
- Interest payments (alternatively, this can be reported under financing activities in IAS 7, and US GAAP)

Items which are added back to [or subtracted from, as appropriate] the net income figure (which is found on the Income Statement) to arrive at cash flows from operations generally include:

- Depreciation (loss of tangible asset value over time)
- Deferred tax
- Amortization (loss of intangible asset value over time)

- Any gains or losses associated with the sale of a non-current asset, because associated cash flows do not belong in the operating section.(unrealized gains/losses are also added back from the income statement)

2.2.2 Investing activities

Examples of investing activities are

- Purchase of an asset (assets can be land, building, equipment, marketable securities, etc.)
- Loans made to suppliers or customers

2.2.3 Financing activities

Financing activities include the inflow of cash from investors such as banks and shareholders, as well as the outflow of cash to shareholders as dividends as the company generates income. Other activities which impact the long-term liabilities and equity of the company are also listed in the financing activities section of the cash flow statement.

Under IAS 7,

- Proceeds from issuing short-term or long-term debt
- Payments of dividends
- Payments for repurchase of company shares
- Repayment of debt principal, including capital leases
- For non-profit organizations, receipts of donor-restricted cash that is limited to long-term purposes

Items under the financing activities section include:

- Dividends paid
- Sale or repurchase of the company's stock
- Net borrowings
- Payment of dividend tax

2.2.4 Disclosure of noncash activities

Under IAS 7, noncash investing and financing activities are disclosed in footnotes to the financial statements. Under US GAAP, noncash activities may be disclosed in a footnote or within the cash flow statement itself. Noncash financing activities may include

- Leasing to purchase an asset
- Converting debt to equity
- Exchanging noncash assets or liabilities for other noncash assets or liabilities
- Issuing shares in exchange for assets

2.2.5 Preparation methods

The direct method of preparing a cash flow statement results in a more easily understood report. The indirect method is almost universally used, because FAS 95 requires a supplementary report similar to the indirect method if a company chooses to use the direct method.

Direct method

The direct method for creating a cash flow statement reports major classes of gross cash receipts and payments. Under IAS 7, dividends received may be reported under operating activities or under investing activities. If taxes paid are directly linked to operating activities, they are reported under operating activities; if the taxes are directly linked to investing activities or financing activities, they are reported under investing or financing activities.

Sample cash flow statement using the direct method

Cash flows from (used in) operating activities

Cash receipts from customers	27,500
Cash paid to suppliers and employees	(20,000)
Cash generated from operations (sum)	7,500
Interest paid	(2,000)
Income taxes paid	(4,000)
Net cash flows from operating activities	1,500

Cash flows from (used in) investing activities

Proceeds from the sale of equipment	7,500
Dividends received	3,000
Net cash flows from investing activities	10,500

Cash flows from (used in) financing activities

Dividends paid	(2,500)
Net cash flows used in financing activities	(2,500)
Net increase in cash and cash equivalents	9,500
Cash and cash equivalents, beginning of year	1,000
Cash and cash equivalents, end of year	\$10,500

Indirect method

The indirect method uses net-income as a starting point, makes adjustments for all transactions for non-cash items, then adjusts for all cash-based transactions. An increase in an asset account is subtracted from net income, and an increase in a liability account is added back to net income. This method converts accrual-basis net income (or loss) into cash flow by using a series of additions and deductions.

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The following rules are used to make adjustments for changes in current assets and liabilities, operating items not providing or using cash and nonoperating items.

- Decrease in non-cash current assets are added to net income
- Increase in non-cash current asset are subtracted from net income
- Increase in current liabilities are added to net income
- Decrease in current liabilities are subtracted from net income
- Expenses with no cash outflows are added back to net income (depreciation and/or amortization expense are the only operating items that have no effect on cash flows in the period)
- Revenues with no cash inflows are subtracted from net income
- Non operating losses are added back to net income
- Non operating gains are subtracted from net income

Example: cash flow of Citigroup:

Citigroup	Cash	Flow	Statement
(all numbers in millions of US\$)			
<i>Period ending</i>		12/31/2007	12/31/2006 12/31/2005
Net income		21,538	24,589 17,046

Operating activities, cash flows provided by or used in:

Depreciation and amortization	2,790	2,592	2,747
Adjustments to net income	4,617	621	2,910
Decrease (increase) in accounts receivable	12,503	17,236	--
Increase (decrease) in liabilities (A/P, taxes payable)	131,622	19,822	37,856
Decrease (increase) in inventories	--	--	--
Increase (decrease) in other operating activities	(173,057)	(33,061)	(62,963)
Net cash flow from operating activities	13	31,799	(2,404)

Investing activities, cash flows provided by or used in:

Capital expenditures	(4,035)	(3,724)	(3,011)
Investments	(201,777)	(71,710)	(75,649)
Other cash flows from investing activities	1,606	17,009	(571)
Net cash flows from investing activities	(204,206)	(58,425)	(79,231)

Financing activities, cash flows provided by or used in:

Dividends paid	(9,826)	(9,188)	(8,375)
Sale (repurchase) of stock	(5,327)	(12,090)	133
Increase (decrease) in debt	101,122	26,651	21,204
Other cash flows from financing activities	120,461	27,910	70,349
Net cash flows from financing activities	206,430	33,283	83,311
Effect of exchange rate changes	645	(1,840)	731
Net increase (decrease) in cash and cash equivalents	2,882	4,817	2,407

2.3 BALANCE OF PAYMENTS

Balance of payments accounting system (BOP) is an accounting system design to track buy and sell transactions between countries by an individuals, businesses and government agencies. It is double entry system in which each transaction creates a credit

entry and a debit entry of equal value. Buying goods and services creates debit entries and selling things produces credits entries.

BOP records only those transactions that have some monetary value. It records transactions done in certain period of time, say for a year. It records transactions between residents of one country and residents of other countries. Residents can be individuals, businesses or government agencies. A branch of a firm is considered as resident of parent country since it is not incorporated in host country. Whereas a subsidiary is incorporated in host country and considered as resident of host country.

Conceptually BOP system consists of four major accounts: current account, capital account, official reserve account and errors and omissions. The current account records four types of transactions: exports and imports of merchandise, exports and imports of services, investment income and gift, between residents of different countries. Capital account records capital transactions such as purchase and sales of assets. Capital account includes foreign direct investment (FDI) and portfolio investment. Official reserves account records official reserves held by a national government. It includes assets such as gold, SDRs, convertible currencies and reserve positions at IMF. The errors and omissions account is used to adjust BOP balance such that sum of all four account type approximates to zero.

BOP helps to understand the performance of each country's economy in international market. It helps business people identify emerging markets, understand market competitiveness and helps policy maker to define new policies according to market trend. It also helps policy maker to watch and act as feedback system for their newly implemented policies. It also gives exporters and importers good knowledge about international market transactions and trend to plan their business better. It also reflects country' export and import potential and in turn helps business analysts to monitor international market.

A Balance of payments (BOP) sheet is an accounting record of all monetary transactions between a country and the rest of the world. These transactions include payments for the country's exports and imports of goods, services, and financial capital, as well as financial transfers. The BOP summarises international transactions for a specific period, usually a year, and is prepared in a single currency, typically the

domestic currency for the country concerned. Sources of funds for a nation, such as exports or the receipts of loans and investments, are recorded as +ve or surplus items. Uses of funds, such as for imports or to invest in foreign countries, are recorded as a -ve or deficit item.

When all components of the BOP sheet are included it must balance - that is, it must sum to zero - there can be no overall surplus or deficit. For example, if a country is importing more than it exports, its trade balance will be in deficit, but the shortfall will have to be counter balanced in other ways - such as by funds earned from its foreign investments or by receiving loans from other countries.

Imbalances are possible on elements of the BOP sheet, and this can result in surplus countries accumulating hoards of wealth, while deficit nations become increasingly indebted. Historically there have been different approaches to the question on how to correct imbalances and debate on whether they are something governments should be worried about. With record imbalances held up as one of the contributing factors to the financial crisis of 2007-2009, plans to address imbalances are now high on the agenda of policy makers for 2010.

2.4 HISTORY OF BALANCE OF PAYMENTS ISSUES

Historically, accurate balance of payments figures were not generally available. However, this did not prevent a number of switches in opinion on questions relating to whether or not a nation's government should use policy to encourage a favourable balance.

Pre 1820: Mercantilism

Up until the early 19th century, measures to promote a trade surplus such as tariffs were generally favoured. Power was associated with wealth, and with low levels of growth, nations were best able to accumulate funds either by running trade surpluses or by forcefully confiscating the wealth of others. From about the 16th century, Mercantilism was a prevalent theory influencing European rulers, who sometimes strove to have their countries out sell competitors and so build up a "war chest" of gold. This era saw low levels of economic growth, average global per capita income is not considered to

have significantly rose in the whole 800 years leading up to 1820, and is estimated to have increased on average by less than 0.1% per year between 1700 - 1820.

1820 - 1914: Free Trade

From the late 18th century, Mercantilism was challenged by the ideas of Adam Smith and other economic thinkers favouring free trade. After victory in the Napoleonic wars Great Britain began promoting free trade, unilaterally reducing her trade tariffs. Hoarding of gold was no longer encouraged, and in fact Britain exported more capital as a percentage of her national income than any other creditor nation has since. Great Britain's capital exports further helped to correct global imbalances as they tended to be counter cyclical, rising when Britain's economy went into recession, thus compensating other states for income lost from export of goods. According to historian Carroll Quigley, Great Britain could afford to act benevolently in the 19th century due to the advantages of her geographical location, her naval power and her economic ascendancy as the first nation to enjoy an industrial revolution . Though Current Account controls were still widely used (in fact all industrial nations apart from Great Britain and the Netherlands actually increased their tariffs and quotas in the decades leading up to 1914, though this was motivated more by a desire to protect "infant industries" than to encourage a trade surplus) , capital controls were largely absent, and people were generally free to cross international borders without requiring passports. A gold standard enjoyed wide international participation especially from 1870, further contributing to close economic integration between nations. The period saw substantial global growth, in particular for the volume of international trade which grew tenfold between 1820 - 1870 and then by about 4% annually from 1870 to 1914.

1914 - 1945: de-Globalisation

The favourable economic conditions that had prevailed up until 1914 were shattered by the First World War, and efforts to re-establish them in the 1920s were not generally successful. During the great depression most countries abandoned the gold standard, and there was a return to mercantilist type "beggar thy neighbours" policies, with countries competitively devaluing there exchange rates, thus effectively competing to export unemployment. Average global growth was slow in this period, and international trade declined.

1945 - 1971: Bretton Woods

Following World War II, the Bretton Woods institutions (the International Monetary Fund and World Bank) were set up to support an international monetary system designed to encourage free trade while also offer states options to correct imbalances without having to deflate their economies. Fixed but flexible exchange rates were established, with the system anchored by the dollar which alone remained convertible into gold. The Bretton Woods system ushered in a period of high global growth, known as the Golden Age of Capitalism, however it came under pressure due to imbalances related to the central role of the dollar, with imbalances causing gold to flow out of the US and a loss of confidence in the United States ability to supply gold for all future claims by dollar holders.

1971 - 2009: Transition, Washington Consensus, Bretton Woods II

The Bretton Woods system came to an end between 1971 -73. There were attempts to repair the system of fixed exchanged rate over the next few years, but these were soon abandoned, as were determined efforts for the US to avoid BOP imbalances. Part of the reason was displacement of the previous dominant economic paradigm - Keynesianism- by the Washington Consensus , with economists and economics writers such as Murray Rothbard and Milton Friedman arguing that there was no great need to be concerned about BOP issues. According to Rothbard:

Fortunately, the absurdity of worrying about the balance of payments is made evident by focusing on inter-state trade. In the immediate aftermath of the Bretton Woods collapse, countries generally tried to retain some control over their exchange rate by independently managing it, or by intervening in the Forex as part of a regional bloc, such as *the Snake* which formed in 1971; it was a group of European countries who tried to retain stable rates at least with each other, the so called "snake" evolved into the ERM by 1979. From the mid 1970s however, and especially in the 1980s and early 90s, many other countries followed the US in liberalising controls on both their capital and current accounts, in adopting a somewhat relaxed attitude to their balance of payments and in allowing the value of their currency to float relatively freely with exchange rates determined mostly by the market. Developing countries who chose to allow the market to determine their exchange rates would often develop sizeable current account deficits,

financed by capital account inflows such as loans and investments, though this often ended in crises when investors lost confidence.

A turning point was the 1997 Asian Financial Crisis where unsympathetic responses by western powers caused policy makers in emerging economies to re-assess the wisdom of relying on the free market; by 1999 the developing world as a whole stopped running current account deficits while the US current account deficit began to rise sharply. This new form of imbalance began to develop in part due to the practice of emerging economies (principally China) in pegging their currency against the dollar, rather than allowing the value to freely float. This state of affairs has been referred to as Bretton Woods II. According to economics writer Martin Wolf, in the eight years leading up to 2007, "three quarters of the foreign currency reserves accumulated since the beginning of time have been piled up".

2009 and later: Post Washington Consensus

Speaking after the 2009 G-20 London summit, Gordon Brown announced "the Washington Consensus is over". There is now broad agreement that large imbalances between different countries do matter; mainstream US economist C. Fred Bergsten has argued the US deficit and the associated large inbound capital flows into the US was one of the causes of the financial crisis of 2007-2008. In 2007 when the crises began, the total BOP imbalance was \$1680bn. On the credit side, the biggest current account surplus was China with approx. \$362Bn, followed by Japan at \$213Bn and Germany at £185BN, with oil producing countries such as Saudi Arabia also having large surpluses. On the debit side, the biggest current account deficit was over £700Bn, with the UK, Spain and Australia accounting for close to a further \$300. While there have been warnings of future cuts in public spending, deficit countries on the whole did not make these in 2009, in fact the opposite happened with increased public spending contributing to recovery as part of global efforts to increase demand. The emphases has instead been on the surplus countries, with the IMF, EU and nations such as the US, Brazil and Russia asking them to assist with the adjustments to correct the imbalances. Japan has allowed her currency to appreciate, but has only limited scope to contribute to the rebalancing efforts thanks in part to her ageing population. The Euro used by Germany is allowed to float fairly freely

in value, however further appreciation would be problematic for other members of the currency union such as Spain, Greece and Ireland who run large deficits.

2.5 MAKE UP OF THE BALANCE OF PAYMENTS SHEET

Since 1973, the two principle divisions on the BOP have been the current account and the capital account.

The *current account* shows the net amount a country is earning if its in surplus, or spending if its in deficit. It is the sum of the balance of trade (net earnings on exports - payments for imports), factor income (earnings on foreign investments - payments made to foreign investors) and cash transfers.

The *capital account* records the net change in ownership of foreign assets. It includes the reserve account (the international operations of a nations central bank), along with loans and investments between the country and the rest of world (but not the future regular repayments / dividends that the loans and investments yield, those are earnings and will be recorded in the current account).

Expressed with the standard meaning for the *capital account*, the BOP identity is:

$$\text{BOP} = \text{Current account} - \text{Capital account}_{(+ \text{ or } - \text{ Balancing item})}$$

The *balancing item* is simply an amount that accounts for any statistical errors and make sure the current and capital accounts sum to zero. At high level, by the principles of double entry accounting, an entry in the current account gives rise to an entry in the capital account, and in aggregate the two accounts should balance. A balance isnt always reflected in reported figures, which might for example report a surplus for both accounts, but when this happens it always means something been missed out, most commonly the operations of the countries central bank.

An actual balance sheet will typically have numerous sub headings under the principle divisions. For example, entries under **Current account** might include:

- *Trade* - buying and selling of goods and services
 - *Exports* - a credit entry
 - *Imports* - a debit entry
 - *Trade balance* - the sum of Exports and Imports
- *Factor income* - repayments and dividends from loans and investments

- *Factor earnings* - a credit entry
- *Factor payments* - a debit entry
 - *Factor income balance* - the sum of earnings and payments.

Especially in older balance sheets a common division was between visible and invisible entries. Visible trade would record the import and sales of physical groups. Invisible trade would record services, and sometimes would be grouped with transfer and factor income as invisible earnings.

2.5.1 Discrepancies in the use of term "Balance of Payments"

According to economics writer J. Orlin Grabbe the term *Balance of Payments* is sometimes misused by people who aren't aware of the accepted meaning, not only in general conversation but in financial publications and the economic literature.

A common source of confusion is to miss out the *reserve account* entry which records the activity of the nation's central bank. Once this is done, the BOP can be in surplus (which implies the central bank is building up foreign exchange reserves) or in deficit (which implies the central bank is running down its reserves or borrowing from abroad) The term can also be misused to mean just relatively narrow parts of the BOP such as the Trade Deficit, which means missing out parts of the current account and the entire capital account. Another cause of confusion is the different naming conventions in use. Before 1973 there was no standard way to break down the BOP sheet, with the separation into invisible and visible payments sometimes being the principle divisions. The IMF have their own standards for the BOP sheet; at high level its the same as the standard definition, but it has different nomenclature, in particular with respect to the meaning giving to the term *capital account*.

The IMF Definition

The IMF use a particular set of definitions for the BOP, which is also used by the OECD, and the United Nations' SNA.

The main difference with the IMF definition is that they use the term **financial account** to use what the rest of the world calls the *capital account*. The IMF do use the term *capital account*, but only to mean a relatively small component of their *financial account* (principally consisting of capital transfers, which often doesn't even have a

separate entry on standard BOP sheets). Expressed with the IMF definition, the BOP identity can be written:

$$\text{BOP} = \text{Current account} - \text{Financial account} (+ \text{ or } - \text{ Balancing item})$$

The IMF use the term *current account* in the same way as the standard definition, although they have their own names for their three leading sub divisions, which are:

- The *goods and services account* (the overall trade balance)
- The *primary income account* (factor income such as from loans and investments)
- The *secondary income account* (transfer payments)

2.5.2 Imbalances

While the BOP has to balance overall, surpluses or deficits on its individual elements can lead to imbalances between countries. In general there is concern over deficits in the current account. Countries with deficits in their current accounts will build up increasing debt and/or see increased foreign ownership of their assets. The types of deficits that typically raise concern are

- A *visible trade deficit* where a nation is importing more physical goods than it exports (even if this is balanced by the other components of the current account.)
- An overall *current account deficit*.
- A *basic deficit* which is the current account plus foreign direct investment (but excluding other elements of the capital account like short terms loans and the reserve account.)

As discussed in the history section below, the *Washington Consensus* period saw a swing of opinion towards the view that there is no need to worry about imbalances. Opinion swung back in the opposite direction in the wake of *financial crisis of 2007–2009*. Mainstream opinion expressed by the leading financial press and economists, international bodies like the IMF, and the leaders of surplus and deficit countries alike has returned to the view that large current account imbalances do matter. Some economists do however remain relatively unconcerned about imbalances and there have been assertions, such as by Michael P. Dooley, David Folkerts-Landau and Peter Garber, that nations need to avoid temptation to switch to protectionism as a means to correct imbalances.

2.5.3 Balancing Mechanism

One of the three fundamental functions of an international monetary system is to provide mechanism to correct imbalances.

Broadly speaking, there are three possible methods to correct BOP imbalances, though in practice a mixture including some degree of at least the first two methods tends to be used. These methods are adjustments of exchange rates; adjustment of nation's internal prices along with its levels of demand; and rules based adjustment. Increasing the desirability of exports through other means can also help, though it is generally assumed a nation is always trying to develop and sell its products to the best of its abilities.

Rebalancing by changing the exchange rate

And upwards shift in the value of nations currency relative to others will make a nations exports less competitive and make imports cheaper and so will tend to correct a current account surplus. It also tends to make investment flows into the capital account less attractive so will help with a surplus there to. Conversely a downward shift in the value of a nations currency makes it more expensive for its citizens to buy imports and increases the competitiveness of their exports, thus helping to correct a deficit (though the solution often doesn't have a positive impact immediately due to the Marshall-Lerner Condition.

Exchange rates can be adjusted deliberately in a rules based or managed currency regime, and when left to float freely in the market they also tend to change in the direction that will restore balance. When a country is selling more than it imports, the demand for its currency will tend to increase as other countries ultimately need the selling countries currency to make payments for the exports. The extra demand tends to cause a rise of the currencies price relative to others. When a country is importing more than it exports, the supply of its own currency on the international market tends to increase as it tries to exchange it for foreign currency to pay for its imports, and this extra supply tends to cause the price to fall. BOP effects are not the only market influence on exchange rates however; they are also influenced by differences in national interest rates and by speculative flows.

Rebalancing by adjusting internal prices and demand

When exchange rates are fixed by a rigid gold standard, or when imbalances exist between members of a currency union such as the Eurozone, the standard approach to correct imbalances is by making changes to the domestic economy. To a large degree, the change is optional for the surplus country, but compulsory for the deficit country. In the case of a gold standard, the mechanism is largely automatic. When a country has a favourable trade balance, as a consequence of selling more than it buys it will experience a net inflow of gold. The natural effect of this will be to increase the money supply, which leads to inflation and an increase in prices, which then tends to make its goods less competitive and so will decrease its trade surplus. However the nation has the option of taking the gold out of economy (sterilising the inflationary effect). Thus building up a hoard of gold and retaining its favourable balance of payments. On the other hand, if a country has an adverse BOP its will experience a net loss of gold, which will automatically have a deflationary effect, unless it chooses to leave the gold standard. Prices will be reduced, making its exports more competitive, and thus correcting the imbalance. While the gold standard is generally considered to have been successful up until 1914, correction by deflation to the degree required by the large imbalances that arose after WWI proved painful, with deflationary policies contributing to prolonged unemployment but not re-establishing balance, and apart from France and the US all former members had left the gold standard by the mid 1930s.

A possible method for surplus countries such as Germany to contribute to rebalancing efforts when exchange rate adjustment is not suitable is to increase its level of internal demand (i.e. its spending on goods). While a current account surplus is commonly understood as the excess of earnings over spending, and alternative expression is that it is the excess of savings over investment.

That is: $CA = NS - NI$ {where CA = current account, NS = national savings (private plus government sector), NI = national investment.}

If a nation is earning more than it spends the net effect will be to build up savings, except to the extent that those savings are being used for investment. If consumers can be encouraged to spend more instead of saving, or if the government runs a fiscal deficit to

offset private savings, or if investment is increased, then any current account surplus will tend to be reduced.

Rules based rebalancing mechanisms

Nations can agree to fix their exchange rates against each other, and then correct any imbalances that arise by rules based and negotiated exchange rate changes and other methods. The Bretton Woods system of fixed but adjustable exchange rates was an example of a rules based system, though it still relied primarily on the two traditional mechanisms. Keynes, one of the architects of the Bretton Woods system had wanted additional rules to encourage surplus countries to share the burden of rebalancing, as he argued that they were in a stronger position to do so. Keynes suggested that traditional balancing should be supplemented by the threat of confiscation of a portion of excess revenue if the surplus country did not choose to spend it on additional imports. However his ideas were not accepted by the Americans at the time. In 2008 and 2009, American economist Paul Davidson had been promoting his revamped form of Keynes's plan as a possible solution to global imbalances which in his opinion would expand growth all rounds with out the downside risk of other rebalancing methods.

Activity 2

1. Discuss the approach to flow of funds of national income accounting.
2. What do you understand by cash flow statement. Discuss with suitable example.
3. Explain the concept of balance of payments. Discuss its rebalancing mechanism.
4. Discuss the journey of balance of payments from nineteenth century till date.

2.6 SUMMARY

Approaches toward flow of funds in national income accounting and balance of payments are dealt in detail in this unit. In flow of funds we discussed about cash flow statement that shows how changes in balance sheet accounts and income affect cash and cash equivalents, and breaks the analysis down to operating, investing, and financing activities. Further Balance of payments accounting system is explained as an accounting system design to track buy and sell transactions between countries by an individuals, businesses and government agencies. History of balance of payment accounting has been

discussed right from inception that is from 1820 to 2009. Additionally some balancing mechanisms are described with suitable examples.

2.7 FURTHER READINGS

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POST GRADUATE PROGRAMME
M.A. (Final)
Economics

DISTANCE EDUCATION
SELF INSTRUCTIONAL MATERIAL

BLOCK : II- KEYNES THEORY OF
EMPLOYMENT AND BUSINESS
CYCLES

- Unit-1 Keynesian Economics and the law of consumption
- Unit-2 Investment function and Keynes theory of employment
- Unit-3 Business Cycles

BLOCK 2 KEYNES THEORY OF EMPLOYMENT AND BUSINESS CYCLES

The aim of this block is to present certain theories and approaches related to Keynes theory of employment and business cycles which are one of the most basic concepts in macro economic analyses.

First unit deals with explaining the Keynesian economics and the law of consumption. The consumption function has been discussed followed by the psychological law of consumption and its implications. Law of consumption in short and long run and various approaches to consumption functions according to Keynes point of view are explained in detail.

Unit 2 discusses the investment function and Keynes theory of employment. Excessive savings are discussed and rate of return and marginal efficiency are described in a detailed manner. The concept of multiplier accelerator and its related investment behavior has been revealed. The affects of inflation on investment decisions is analysed and various policy measures related to investment are focused in last section of the unit.

The last unit that is unit 3 presents to you the basic and important concepts of business cycles. The approaches to business cycles are discussed first following by Schumpeter's views on business cycles. Kaldor's non linear cycles are explained with Samuelson and Hicks model. Finally Implication of monetary and fiscal policies and control of business cycles are discussed in a detailed discussion.

UNIT 1

KEYNESIAN ECONOMICS AND THE LAW OF CONSUMPTION

Objectives

After studying this unit you should be able to:

- Define the approach to Keynesian economics
- Understand the consumption function and psychological law of consumption.
- Know the consumption function in short and long run.
- Explain the various approaches to consumption function.

Structure

1.1 Introduction

1.2 The consumption function

1.3 Psychological law of consumption and its implications

1.4 Law of consumption in short and long run.

1.5 Summary

1.6 Further readings

1.1 INTRODUCTION

Keynesian economics is a macroeconomic theory based on the ideas of 20th-century British economist John Maynard Keynes. Keynesian economics argues that private sector decisions sometimes lead to inefficient macroeconomic outcomes and therefore advocates active policy responses by the public sector, including monetary policy actions by the central bank and fiscal policy actions by the government to stabilize output over the business cycle. The theories forming the basis of Keynesian economics were first presented in *The General Theory of Employment, Interest and Money*, published in 1936; the interpretations of Keynes are contentious, and several schools of thought claim his legacy.

Keynesian economics advocates a mixed economy—predominantly private sector, but with a large role of government and public sector—and served as the economic model during the latter part of the Great Depression, World War II, and the post-war Golden Age of Capitalism, 1945–1973, though it lost some influence following the stagflation of the 1970s. As a middle way between laissez-faire capitalism and socialism, it has been and continues to be attacked from both the right and the left. The advent of the global financial crisis in 2007 has caused a resurgence in Keynesian thought. Keynesian economics has provided the theoretical underpinning for the plans of President Barack Obama, Prime Minister Gordon Brown and other global leaders to rescue the world economy.

OVERVIEW

In Keynes's theory, there are some micro-level actions of individuals and firms that can lead to aggregate macroeconomic outcomes in which the economy operates below its potential output and growth. Some classical economists had believed in Say's Law, that supply creates its own demand, so that a "general glut" would therefore be impossible. Keynes contended that aggregate demand for goods might be insufficient during economic downturns, leading to unnecessarily high unemployment and losses of potential output. Keynes argued that government policies could be used to increase aggregate demand, thus increasing economic activity and reducing unemployment and deflation.

Keynes argued that the solution to depression was to stimulate the economy ("inducement to invest") through some combination of two approaches: a reduction in interest rates and government investment in infrastructure. Investment by government injects income, which results in more spending in the general economy, which in turn stimulates more production and investment involving still more income and spending and so forth. The initial stimulation starts a cascade of events, whose total increase in economic activity is a multiple of the original investment.

A central conclusion of Keynesian economics is that, in some situations, no strong automatic mechanism moves output and employment towards full employment levels. This conclusion conflicts with economic approaches that assume a general tendency towards equilibrium. In the 'neoclassical synthesis', which combines Keynesian macro

concepts with a micro foundation, the conditions of general equilibrium allow for price adjustment to achieve this goal.

More broadly, Keynes saw this as a *general* theory, in which utilization of resources could be high or low, whereas previous economics focused on the *particular* case of full utilization.

The new classical macroeconomics movement, which began in the late 1960s and early 1970s, criticized Keynesian theories, while New Keynesian economics have sought to base Keynes's idea on more rigorous theoretical foundations.

Some interpretations of Keynes have emphasized his stress on the international coordination of Keynesian policies, the need for international economic institutions, and the ways in which economic forces could lead to war or could promote peace.

1.2 THE CONSUMPTION FUNCTION

In economics, the consumption function is a single mathematical function used to express consumer spending. It was developed by John Maynard Keynes and detailed most famously in his book *The General Theory of Employment, Interest, and Money*. The function is used to calculate the amount of total consumption in an economy. It is made up of autonomous consumption that is not influenced by current income and induced consumption that is influenced by the economy's income level.

The simple consumption function is shown as the linear function:

$$C = c_0 + c_1 Y^d$$

where

- C = total consumption,
- c_0 = autonomous consumption ($c_0 > 0$),
- c_1 is the marginal propensity to consume (ie the induced consumption) ($0 < c_1 < 1$), and
- Y^d = disposable income (income after taxes and transfer payments, or $W - T$).

Autonomous consumption represents consumption when income is zero. In estimation, this is usually assumed to be positive. The marginal propensity to consume (MPC), on the other hand measures the rate at which consumption is changing when

income is changing. In a geometric fashion, the MPC is actually the slope of the consumption function.

The MPC is assumed to be positive. Thus, as income increases, consumption increases. However, Keynes mentioned that the increases (for income and consumption) are not equal.

The Keynesian consumption function is also known as the absolute income hypothesis, as it only bases consumption on current income and ignores potential future income (or lack of). Criticism of this assumption lead to the development of Milton Friedman's permanent income hypothesis and Franco Modigliani's life cycle hypothesis.

1.3 PSYCHOLOGICAL LAW OF CONSUMPTION AND ITS IMPLICATIONS

In Keynesian macroeconomics, the **Fundamental Psychological Law** underlying the consumption function states that marginal propensity to consume (MPC) and marginal propensity to save (MPS) are greater than zero(0) but less than one(1)
 $MPC + MPS = 1$

e.g Whenever national income rises by \$1 part of this will be consumed and part of this will be saved

A principle of consumption behavior proposed by John Maynard Keynes stating that people have the propensity to spend a large fraction, but not all, of any additional income received. This psychological law is not so much a principle of psychology as an economic observation about consumption spending and is related to the notion of effective demand.

The psychological law was proposed by John Maynard Keynes in *The General Theory of Employment, Interest and Money*, published in 1936, to capture the essential spending behavior of the household sector. It provides a key part of the consumption foundation upon which Keynesian economics is built.

While Keynes used the term "psychology" to name this law, it is not really a law of psychology or of psychological behavior. Rather, it is a basic observation about consumption and consumer behavior. It postulates the likely relation between income,

specifically changes in aggregate income for the economy, and consumption, specifically consumption expenditures by the household sector.

Generally it is observed that when income increases, consumption also increases but by a less proportion than the increase in income. Suppose the total income of the community is 10 crore and the consumption expenditure is also Rs 10 crore. In that case, there is no saving and investment. Further the income increases to Rs.15 crore. Then, consumption also increases, but not to the extent of Rs15 crore. It may increase to Rs14 crore and Rs 1 crore constitutes the savings. This savings create a gap between Income and Consumption. This gap is in conformity with Keynes Psychological law of consumption, which states that, when aggregate income increases, consumption expenditure shall also increase but by a somewhat smaller amount". This law tells us that people fail to spend on consumption the full amount of increment in income. As income increases, the wants of the people get satisfied and as such when income increases they save more than what they spend. This law may be considered as a rough indication of the actual macro - behaviour of consumers in the short run.

This is the fundamental principle upon which the Keynesian consumption function is based. It is based upon his observations and conclusion derived from the study of consumption function. This law is also called the fundamental law of consumption. It consists of three inter related propositions:

1. When the aggregate income increases, expenditure on consumption will also increase but by a smaller amount.
2. The increased income is distributed over both spending and saving.
3. As income increases, both consumption spending and saving will go up.

These three propositions form Keynes psychological law of consumption. As consumption expenditure progressively diminishes when income increases, a gap between income and expenditure arises. This tendency is so deep rooted in people's habits, customs, and the psychological set up that it is difficult to change in the short run. Hence, it is impossible to raise the propensity to consume of the people so as to increase the national output, income and employment. Increasing the volume of investment in an economy can only fill up the gap between income and Consumption.

Have More, Spend More

The psychological law indicates that the household sector is inclined to use additional income (such as what might be received when the economy expands) to purchase more goods and services. People have more income, so they buy more things. However, and this is an important however, the household sector does not spend all of the additional income. Part of this extra income is set aside as saving.

Consider an example. Suppose that Duncan Thurly, a typical human being consumer, receives a \$1,000 end-of-the-year holiday profit-sharing bonus from his employer. The psychological law indicates that he is likely to spend a large portion of this bonus, say \$900, on something like a new computer. However, he then keeps the remaining portion, \$100, unspent in his savings account.

Alternatively, should Duncan have a drop income of \$1,000 due to a period of involuntary unemployment, then he is likely to reduce his spending by only \$900, also reducing saving by \$100.

The Consumption Line

The psychological law is embodied in the consumption function (or consumption line), such as the one displayed in the exhibit to the right. The vertical axis measures consumption expenditures. The horizontal axis measures income generated from production.

The red line, labeled C, is the consumption line. This line has a positive slope, indicating that greater levels of consumption expenditures result from greater levels of income. Moreover, the slope of the line is numerically less than one. That is, the change in consumption expenditures is less than the change in income.

Consumption Line

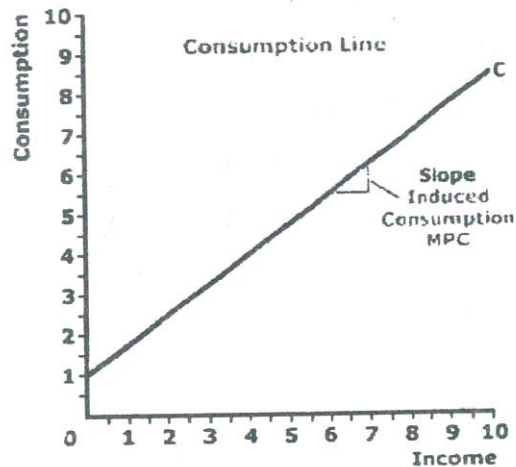


Figure 1

The relation between consumption and income is termed induced consumption and is measured by the marginal propensity to consume, which is the numerical measure of the slope of the consumption line.

Effective Demand

This psychological law is most important for the Keynesian economic notion of effective demand. Effective demand indicates that aggregate expenditures, especially consumption expenditures, are based on the actual income generated by production and not on the income that would be generated if all resources were fully employed.

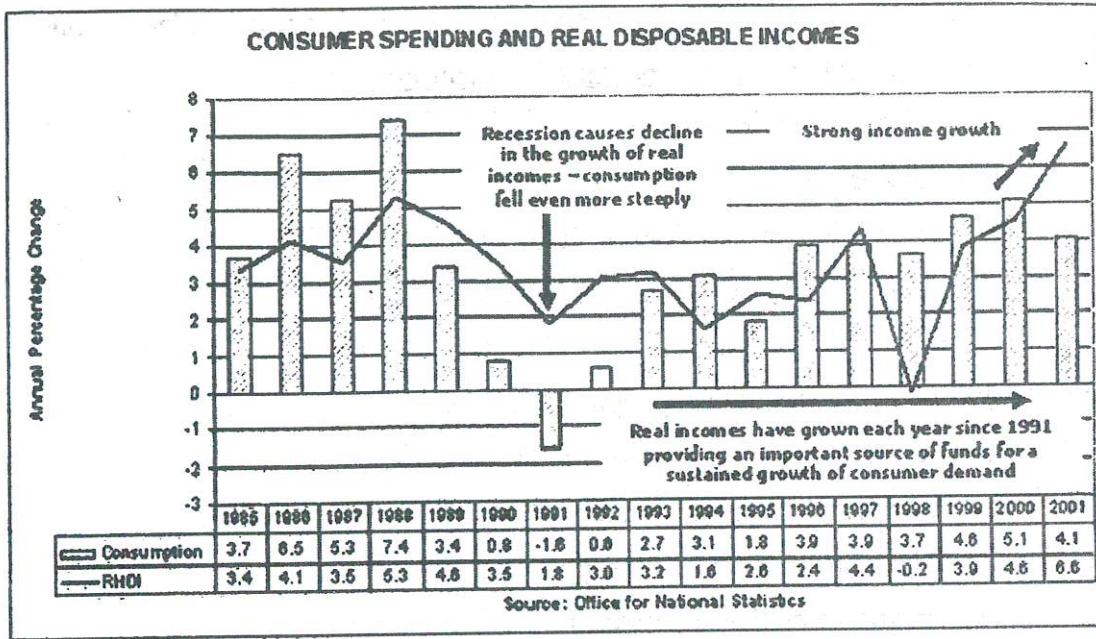
Effective demand was proposed first by Thomas Malthus and later by Keynes as a counter to Say's law that supply creates its own demand. Effective demand, in contrast, suggests that demand creates its own supply (at least up to full employment).

This might seem like a subtle, insignificant distinction, but it helps to separate classical economics and its assurance of full employment from Keynesian economics and the distinct possibility of persistent unemployment.

1.4 LAW OF CONSUMPTION IN SHORT AND LONG RUN

The Keynesian Theory of consumption is that current real disposable income is the most important determinant of consumption in the short run. Real Income is money income adjusted for inflation. It is a measure of the quantity of goods and services that consumers have buy with their income (or budget).

For example, a 10% rise in money income may be matched by a 10% rise in inflation. This means that real income (the quantity or volume of goods and services that can be bought) has remained constant.



The chart above shows how real disposable incomes and consumer spending have grown in recent years. This increase in real incomes has been a factor behind the yearly growth of consumer demand in each of the last nine years.

1.4.1 The Keynesian Consumption Function

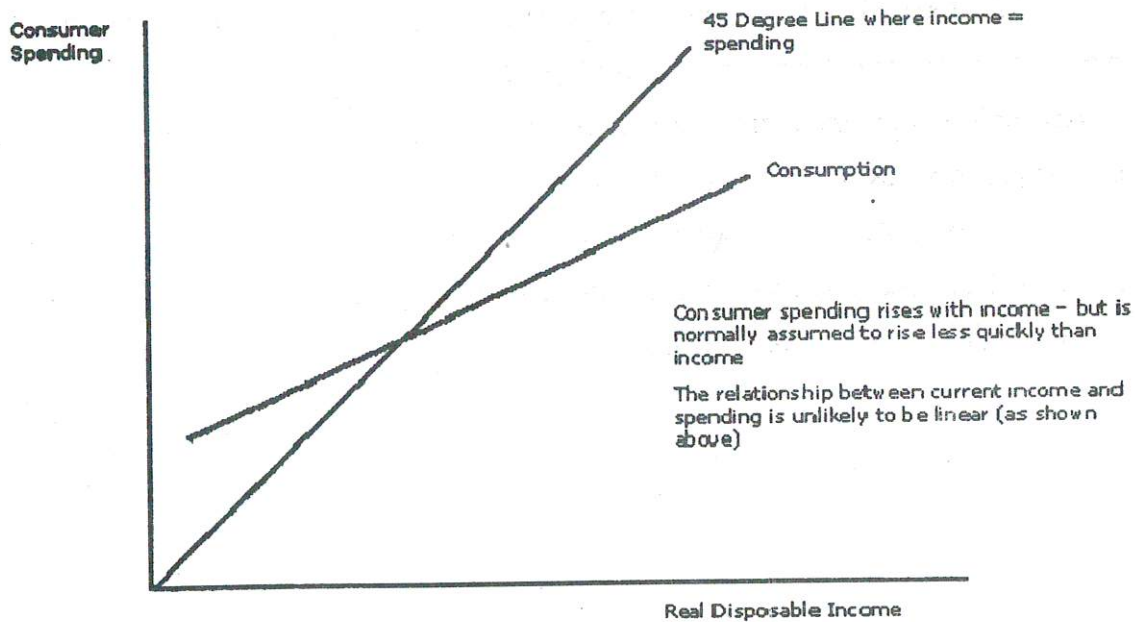


Figure 2

Disposable Income (Y_d) = Gross Income - (Deductions from Direct Taxation + Benefits)

The standard Keynesian consumption function is as follows:

$C = a + c Y_d$ where,

C = Consumer expenditure

a = autonomous consumption. This is the level of consumption that would take place even if income was zero. If an individual's income fell to zero some of his existing spending could be sustained by using savings. This is known as dis-saving.

c = marginal propensity to consume (mpc). This is the change in consumption divided by the change in income. Simply, it is the percentage of each additional pound earned that will be spent.

There is a positive relationship between disposable income (Y_d) and consumer spending (C_t). The gradient of the consumption curve gives the marginal propensity to consume. As income rises, so does total consumer demand.

A change in the marginal propensity to consume causes a pivotal change in the consumption function. In this case the marginal propensity to consume has fallen leading to a fall in consumption at each level of income. This is shown below:

1.4.2 Key Consumption Definitions

Average propensity to consume = Total consumption divided by total income

Average propensity to Save = Total savings divided by total income (also known as the Saving Ratio)

A Shift in the Consumption Function

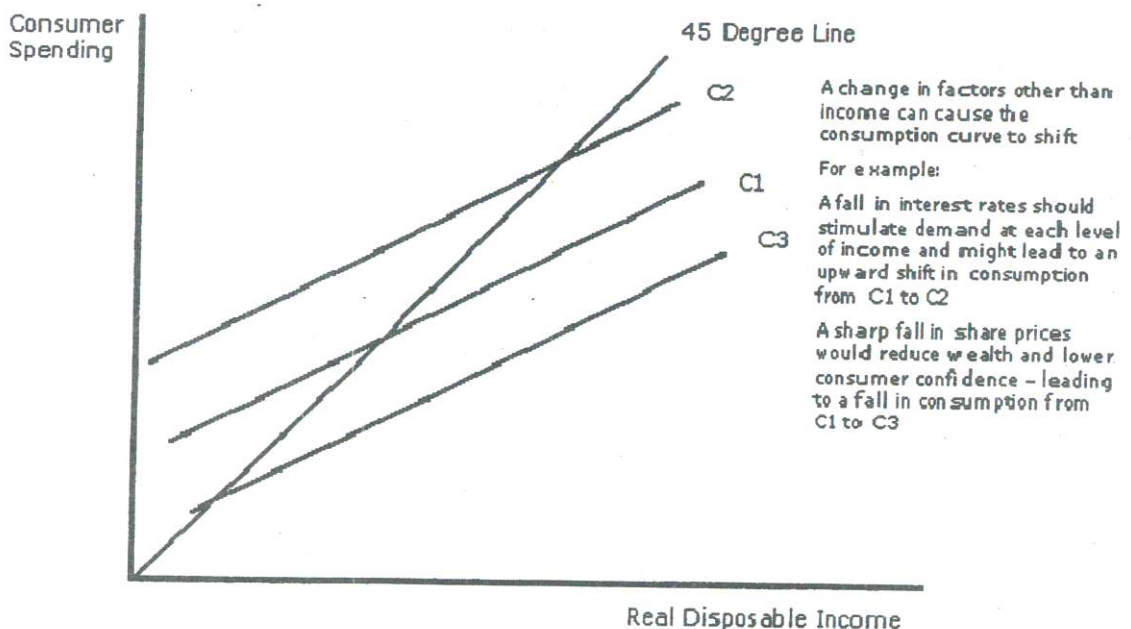


Figure 3

The consumption - income relationship changes when other factors than income change - for example a rise in interest rates or a fall in consumer confidence might lead to a fall in consumption spending at each level of income.

A rise in household wealth or a rise in consumer's expectations might lead to an increased level of consumer demand at each income level (an upward shift in the consumption curve).

Four Approaches to the Consumption Function

- 1) Absolute Income Hypotheses
- 2) Relative Income Hypothesis (James Duesenberry 1949 ~ From Thorstein Veblen)
- 3) Permanent Income Hypothesis (Friedman)
- 4) Life Cycle Hypothesis (Ando & Modigliani)

Theories 3 and 4 are most compatible with Neo-classical economics.

1.4.3 The Absolute Income Hypothesis

$$C^D = a + bY_t$$

The current level of consumption is a straightforward function, driven by the current level of income. This implies that people adapt instantaneously to income changes.

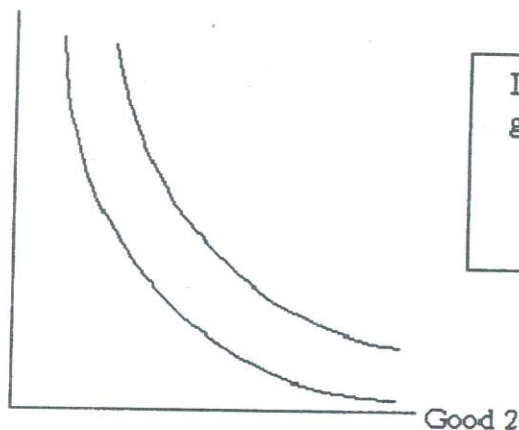
- there is rapid adaptation to income changes
- the elasticity of consumption to current income changes

$$\frac{\partial C_t}{\partial Y_t} = b \quad \text{elasticity} \quad \frac{\partial C_t}{\partial Y_t} * \frac{Y}{C} \quad \text{or divide it by } (C/Y)$$

$$b - \frac{Y}{a + bY} = \frac{bY}{a + bY}$$

The elasticity with respect to current income in other theories will be less. They reduce the sensitivity to current income flows.

Good 1



In economics, we assume that people get more satisfaction or happiness by getting more of either good. We represent this in a utility function, $U(G_1, G_2)$.

Figure 4

1.4.4 The Relative Income Hypothesis

The Duesenberry approach says that people are not just concerned about absolute levels of possession. They are in fact concerned about their possessions relative to others, "Keeping up with the Joneses."

People are not necessarily happier if they have more money. They do however report higher happiness if they have more relative to others.

The new utility function would be:

$$U(G_1, G_2, (G_1/G_1^{POF}), (G_2/G_2^{POF}))$$

← This is known as a status effect

Current economists still support this idea. Ex: Robert Frank and Juliet Schor
 Duesenberry argues that we have a greater tendency to resist spending decreases relative to falls in income than we do to increase expenditure relative to increases of income. The reason is that we don't want to alter our standard of living downward.

$$C_T = a + bY_T + cY^X$$

Y^X is the previous peak level of income (this keeps expenditure from falling in the face of income drops). It is also known as the Drag Effect.

A shift in expenditures relative to a previous level of income is known as the Ratchet Effect, and will be shown below.

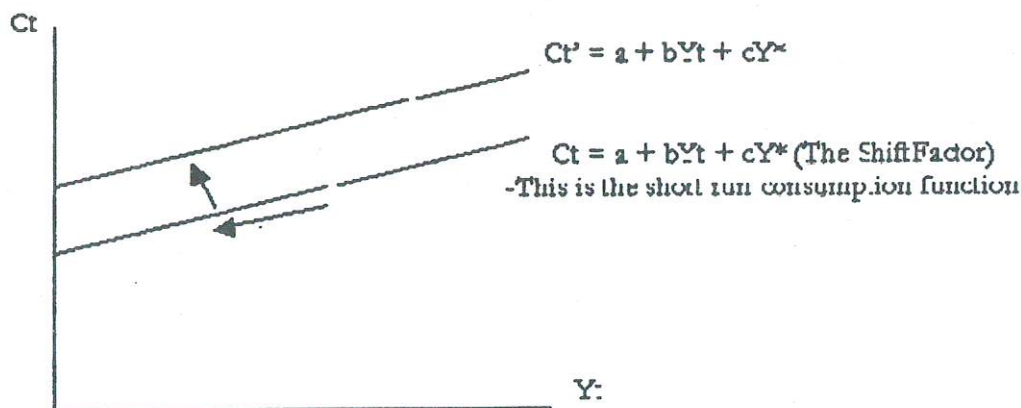


Figure 5

Duesenberry argues that we will shift the curve up or move along the curve, but not we will resist shifts down. When WWII ended, a significant number of economists claimed that there would be a consumption decline and aggregate demand drop which did not occur. This provides supporting evidence.

A long-run consumption function can be drawn, assuming that there is a growth trend. If this is true, previous peak income would have been that of last year and thus would give a consumption function that looks like it depends on current income.

1.4.5 Permanent Income Hypothesis

-Also explains why there was no drop collapse in spending post WWI.

Friedman argues that it would be more sensible for people to use current income, but also at the same time to form expectations about future levels of income and the relative amounts of risk.

Thus, they are forming an analysis of "permanent income."

Permanent Income = Past Income + Expected Future Income

Transitory Income – Income that is earned in excess of, or perceived as an unexpected windfall is called as transitory income. If you get income not equal to what you expected or what you don't expect to get again.

So, he argues that we tend to spend more out of permanent income than out of transitory,

In the Friedman analysis, he treats people as forming their level of expected future income based on their past incomes. This is known as adaptive expectations.

Adaptive Expectations – looking forward in time using past expectations. In this case, we use a distributed lag of past income.

$$Y_{t+1}^p \rightarrow E(Y_{t+1}) = B_0 Y_t + B_1 Y_{t-1} + B_2 Y_{t-2} \dots$$

Where $B_0 > B_1 > B_2$

It is also possible to add a constraint: $B_0 + B_1 + B_2 + B_3 + \dots B_n = 1$

This is expected income, the actual income can be thought of as:

$$Y_{t-1} - Y_{t+1}^p = Y_{t+1}^t$$

Using this, we can construct a new model of the consumption function:

$$C_t = a + bY_t^D + cY_t^t$$

Absolute Income Hypothesis Elasticity

$$\frac{bY_t}{a + bY_t}$$

Permanent Income Hypothesis Elasticity

$$a + bY_{t1} + b_2 Y_{t2} + b_3 Y_{t-3} + \dots cY_t^*$$

There are other factors that people can look at to think about future levels of income. For example, people can think about future interest rates and their effect on their income stream. If you were Friedman, you would do this by using a distributed lag of past incomes.

1.4.6 The Life Cycle Hypothesis

This is primarily attributed to Ando and Modigliani

The basic notion is that consumption spending will be smooth in the face of an erratic stream of income.

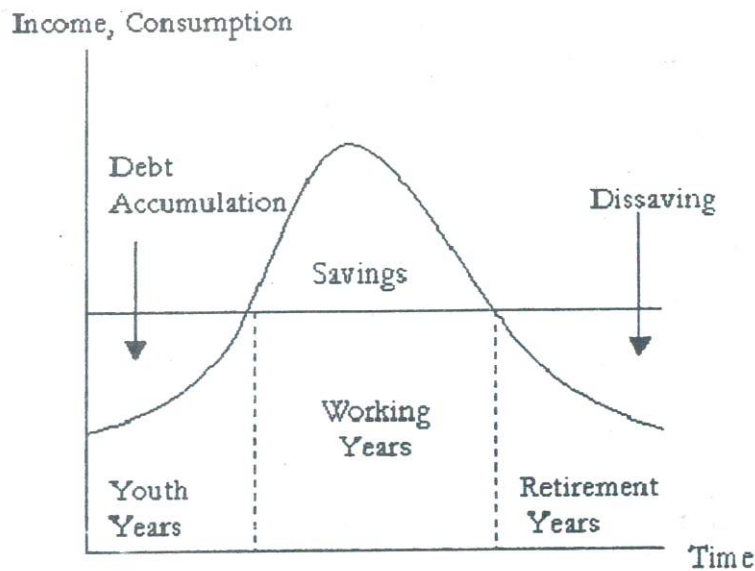


Figure 6

Working Phase:

1. Maintain current consumption, pay off debt from youth years
2. Maintain current consumption, build up reserves

Age distribution now matters when we look at consumption, and in general, the propensity to consume. Debt and wealth are also taken into account when we look at the propensity to consume. The dependence structure of the population will affect or influence consumption patterns.

Lester Thurow (1976) – argued that this model doesn't work because it doesn't presume there is any motive for building wealth other than consumption. Thurow argues that their real motivation is status and power (both internal and external to the family).

The permanent income hypothesis bears a resemblance to the life-cycle hypothesis in that in some sense, in both hypotheses, the individuals must behave as if they have some sense of the future.

To sum it all we can say that, an economic model of the proportion of income spent on consumption. John Maynard Keynes pioneered in this area with the *absolute income hypothesis*, which states that consumption is solely a function of current disposable income. Divergence between Keynes's predictions and subsequent empirical data, especially over the long run, has led to a number of other theories of consumption—

most prominently, those based relative income (Duesenberry), permanent income (Milton Friedman), and life-cycle income (Modigliani and Brumberg).

Keynes argued that any change in income results in a smaller change in consumption—i.e., the marginal propensity to consume is less than one. He also argued that the marginal propensity to consume is less than the average propensity to consume, which implies that consumption declines as a percentage of income as income rises. Short-run studies broadly support a consumption function of this form, but long-run data suggest that the average and the marginal propensities to consume are roughly the same.

The *relative income hypothesis* conceives consumption in relation to the income of other households and past income. The first implies that the proportion of income consumed remains constant provided that a household's position on the income distribution curve holds constant in the long run. This is consistent with long-run evidence. Higher up the income curve, however, there is a lower average propensity to consume. The second part of the hypothesis suggests that households find it easier to adjust to rising incomes than falling incomes. There is, in other words, a “ratchet effect” that holds up consumption when income declines.

The measurement of permanent and lifetime income has become a central issue in recent attempts to specify the consumption function. The *permanent income hypothesis* postulates that consumption depends on the total income and wealth that an individual expects to earn over his or her lifetime. The *life-cycle hypothesis* assumes that individuals consume a constant proportion of the present value of lifetime income as measured in a number of financially distinct periods of life, such as youth, middle age, and old age. Empirical research in this area has proved challenging, because theories of consumption generally include the long-term “use” of durable goods. Consumption data, however, focus primarily on current purchases, or consumption expenditure.

Activity 1

1. What do you understand by law of consumption? Discuss in view of Keynes.
2. Discuss the contribution of Keynes in economics and quote his different approaches to consumption function.
3. Distinguish between relative income hypothesis and permanent hypothesis.
4. Write a short note on life cycle hypothesis.

1.5 SUMMARY

The unit started with introducing the Keynesian economics which is perceived as a macroeconomic theory based on the ideas of 20th-century British economist John

Maynard Keynes. Keynesian economics argues that private sector decisions sometimes lead to inefficient macroeconomic outcomes. Followed by this the consumption function is explained as a single mathematical function used to express consumer spending. Psychological law of consumption function is described along with possible implications in the later section. Law of consumption in short and long run has been discussed with its four approaches called absolute Income Hypotheses, Relative Income Hypothesis, Permanent Income Hypothesis and life Cycle Hypothesis.

1.6 FURTHER READINGS

- J.M. Keynes (1937) "The General Theory of Employment", Quarterly Journal of Economics, Vol. 51
- Mary S. Morgan, The History of Econometric Ideas, Cambridge University Press, 1991
- Paul Mattick, Marx and Keynes: The Limits of Mixed Economy, Boston, Porter Sargent, 1969

UNIT 2

INVESTMENT FUNCTION AND KEYNES THEORY OF EMPLOYMENT

Objectives

After studying this unit you should be able to:

- Understand the approach and scope investment in Keynes theory of employment
- Know the relevance of excessive savings in the theory and in practice
- Appreciate the approaches to marginal efficiency and rate of return.
- Be aware about the concept of multiplier accelerator
- Explain the role of inflation in investment decisions
- Describe the policy measures and their relevance in investment decisions

Structure

- 2.1 Introduction
- 2.2 Excessive savings
- 2.3 Rate of return and marginal efficiency
- 2.4 The multiplier accelerator and investment behavior
- 2.5 Inflation and investment decisions
- 2.6 Policy measures and investment
- 2.7 Summary
- 2.8 Further readings

2.1 INTRODUCTION TO KEYNESIAN THEORY OF INVESTMENT

The Keynesian theory of investment places emphasis on the importance of interest rates in investment decisions. But other factors also enter into the model - not least the expected profitability of an investment project.

Changes in interest rates should have an effect on the level of planned investment undertaken by private sector businesses in the economy.

A fall in interest rates should decrease the cost of investment relative to the potential yield and as result planned capital investment projects on the margin may become worthwhile. A firm will only invest if the discounted yield exceeds the cost of the project.

The inverse relationship between investment and the rate of interest can be shown in a diagram (see below). The relationship between the two variables is represented by the marginal efficiency of capital investment (MEC) curve. A fall in the rate of interest from R1 to R2 causes an expansion of planned investment.

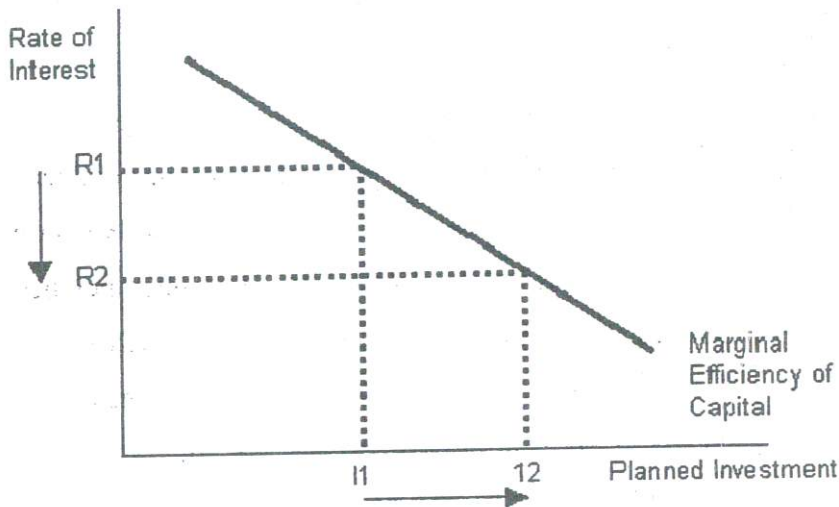


Figure 1

Shifts in the marginal efficiency of capital

Planned investment can change at each rate of interest. For example a rise in the expected rates of return on investment projects would cause an outward shift in the marginal efficiency of capital curve. This is shown by a shift from MEC1 to MEC2 in the diagram below. Conversely a fall in business confidence (perhaps because of fears of a recession) would cause a fall in expected rates of return on capital investment projects. The MEC curve shifts to the left (MEC3) and causes a fall in planned investment at each rate of interest.

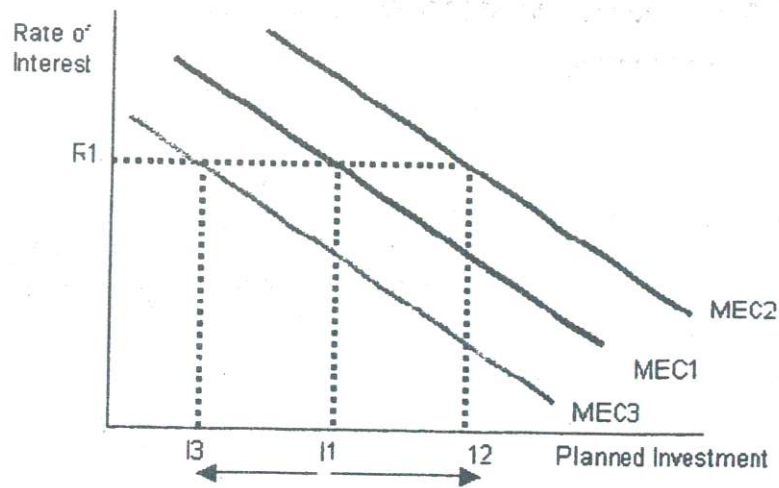


Figure 2

The importance of hurdle rates for investment

British firms are continuing to demand rates of return on new investments that are far too high, undermining industry's ability to re-equip and close the productivity gap with competitor countries according to a survey by the Confederation of British Industry. "Hurdle rates" for major investment projects are 50 per cent higher than they need to be, while the payback periods required are much shorter than in countries such as Germany.

The CBI survey of more than 300 firms showed that they expected to earn an internal rate of return averaging 17 per cent and recover the cost of their investment in two to four years. But experts said that post-tax real returns of 10 per cent were sufficient to justify most investments.

Britain's poor investment record has been a concern both for the CBI and government ministers. Gordon Brown believes that low investment is one of the main reasons for sluggish economic performance, and that macroeconomic stability and a tax regime less biased towards dividends will encourage capital spending.

The chart below tracks real fixed investment spending by manufacturing industry since 1990. Investment spending collapsed during the economic recession of the early 1990s. There was a surge in investment during the mid-late 1990s- but capital spending fell sharply once more in 1999 following a drop in business confidence and a slowdown in demand and output. A small rebound in manufacturing investment during 2000 came as welcome relief.

MANUFACTURING CAPITAL INVESTMENT SPENDING

% annual change at constant 1995 prices

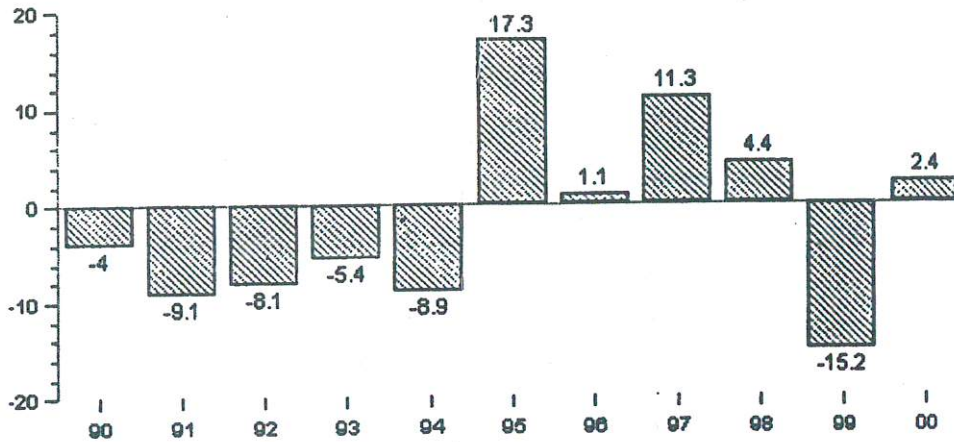


Figure 3 The investment related aspects in Keynes theory are discussed in this unit.

2.2 EXCESSIVE SAVINGS

To Keynes, excessive saving, i.e. saving beyond planned investment, was a serious problem, encouraging recession or even depression. Excessive saving results if investment falls, perhaps due to falling consumer demand, over-investment in earlier years, or pessimistic business expectations, and if saving does not immediately fall in step, the economy would decline.

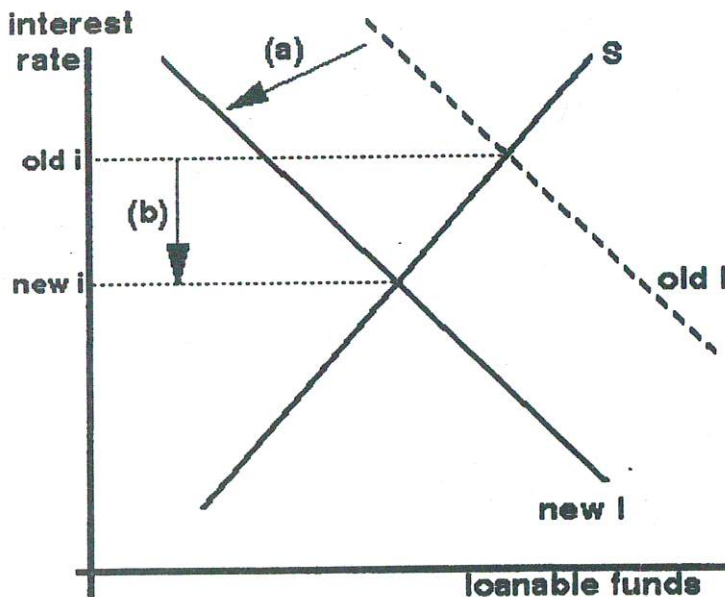


Figure 4

The classical economists argued that interest rates would fall due to the excess supply of "loanable funds". The first diagram, adapted from the only graph in The General Theory, shows this process. (For simplicity, other sources of the demand for or supply of funds are ignored here.) Assume that fixed investment in capital goods falls from "old I" to "new I" (step a). Second (step b), the resulting excess of saving causes interest-rate cuts, abolishing the excess supply: so again we have saving (S) equal to investment. The interest-rate (i) fall prevents that of production and employment.

Keynes had a complex argument against this laissez-faire response. The graph below summarizes his argument, assuming again that fixed investment falls (step A). First, saving does not fall much as interest rates fall, since the income and substitution effects of falling rates go in conflicting directions. Second, since planned fixed investment in plant and equipment is mostly based on long-term expectations of future profitability, that spending does not rise much as interest rates fall. So S and I are drawn

as steep (inelastic) in the graph. Given the inelasticity of both demand and supply, a large interest-rate fall is needed to close the saving/investment gap. As drawn, this requires a negative interest rate at equilibrium (where the new I line would intersect the old S line). However, this negative interest rate is not necessary to Keynes's argument.

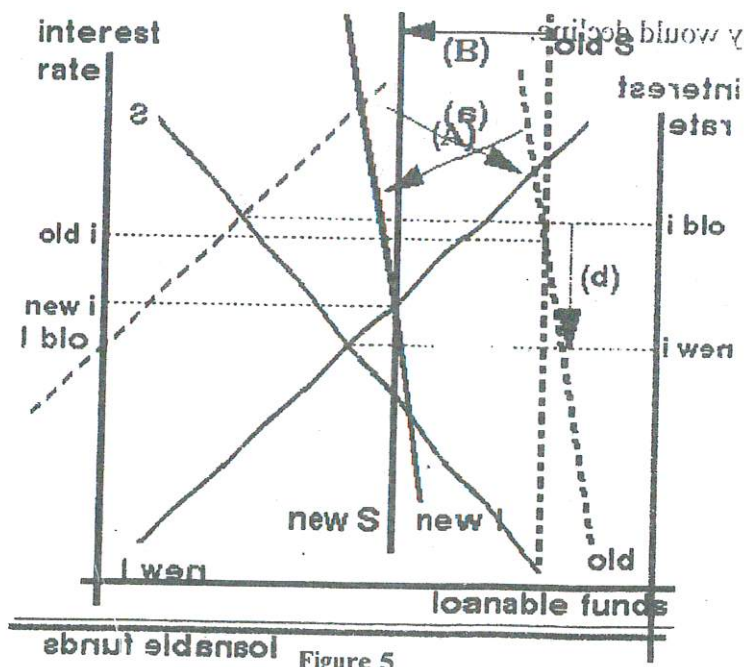


Figure 5

Figure 4

Third, Keynes argued that saving and investment are not the main determinants of interest rates, especially in the short run. Instead, the supply of and the demand for the stock of money determine interest rates in the short run. (This is not drawn in the graph.) Neither changes quickly in response to excessive saving to allow fast interest-rate adjustment.

Finally, because of fear of capital losses on assets besides money, Keynes suggested that there may be a "liquidity trap" setting a floor under which interest rates cannot fall. While in this trap, interest rates are so low that any increase in money supply will cause bond-holders (fearing rises in interest rates and hence capital losses on their bonds) to sell their bonds to attain money (liquidity). In the diagram, the equilibrium suggested by the new I line and the old S line cannot be reached, so that excess saving persists. Some (such as Paul Krugman) see this latter kind of liquidity trap as prevailing in Japan in the 1990s. Most economists agree that nominal interest rates cannot fall below zero; however, some economists (particularly those from the Chicago school) reject the existence of a liquidity trap.

Even if the liquidity trap does not exist, there is a fourth (perhaps most important) element to Keynes's critique. Saving involves not spending all of one's income. It thus means insufficient demand for business output, unless it is balanced by other sources of demand, such as fixed investment. Thus, excessive saving corresponds to an unwanted accumulation of inventories, or what classical economists called a general glut. This pile-up of unsold goods and materials encourages businesses to decrease both production and employment. This in turn lowers people's incomes—and saving, causing a leftward shift in the S line in the diagram (step B). For Keynes, the fall in income did most of the job by ending excessive saving and allowing the loanable funds market to attain equilibrium. Instead of interest-rate adjustment solving the problem, a recession does so. Thus in the diagram, the interest-rate change is small.

Whereas the classical economists assumed that the level of output and income was constant and given at any one time (except for short-lived deviations), Keynes saw this as the key variable that adjusted to equate saving and investment.

Finally, a recession undermines the business incentive to engage in fixed investment. With falling incomes and demand for products, the desired demand for

factories and equipment (not to mention housing) will fall. This accelerator effect would shift the 1ST line to the left again, a change not shown in the diagram above. This recreates the problem of excessive saving and encourages the recession to continue.

In sum, to Keynes there is interaction between excess supplies in different markets, as unemployment in labor markets encourages excessive saving—and vice-versa. Rather than prices adjusting to attain equilibrium, the main story is one of quantity adjustment allowing recessions and possible attainment of underemployment equilibrium.

2.3 RATE OF RETURN AND MARGINAL EFFICIENCY

In his General Theory, John Maynard Keynes (1936: Ch.11) proposed an investment function of the sort $I = I_0 + I(r)$ where the relationship between investment and interest rate was of a rather naive form. Firms were presumed to "rank" various investment projects depending on their "internal rate of return" (or "marginal efficiency of investment") and thereafter, faced with a given rate of interest, chose those projects whose internal rate of return exceeded the rate of interest. With an infinite number of projects available, this amounted to arguing that firms would invest until their marginal efficiency of investment was equal to the rate of interest, i.e. $MEI = r$.

More elaborate considerations of Keynes's theory, however, were forced to ask *what* is the internal rate of return? This is far from evident. Keynes defined the internal rate of return as the "marginal efficiency of capital", which Abba Lerner (1944, 1953), more accurately, rebaptized as the "marginal efficiency of investment" (MEI). Keynes claimed that this could be defined as follows:

"I define the marginal efficiency of capital as being equal to the rate of discount which would make the present value of the series of annuities given by the returns expected from the capital asset during its life just equal its supply price" (Keynes, 1936: p. 135)

In contrast, Keynes defines the "*supply price* of the capital asset...not the market price at which an asset of the type in question can actually be purchased in the market, but the price which would just induce a manufacturer newly to produce an additional unit of such assets, i.e. what is sometimes called its *replacement cost*" (1936: p.135). Consequently:

"The relation between the prospective yield of a capital asset and its supply price or replacement cost, i.e. the relation between the prospective yield of one more unit of that type of capital and the cost of producing that unit, furnishes us with the *marginal efficiency of capital* of that type" (Keynes, 1936: p.135).

When a man buys an investment or capital-asset, he purchases the right to the series of prospective returns, which he expects to obtain from selling its output, after deducting the running expenses of obtaining that output, during the life of the asset. This series of annuities Q_1, Q_2, \dots, Q_n it is convenient to call the *prospective yield* of the investment.

Over against the prospective yield of the investment we have the *supply price* of the capital-asset, meaning by this, not the market-price at which an asset of the type in question can actually be purchased in the market, but the price which would just induce a manufacturer newly to produce an additional unit of such assets, i.e. what is sometimes called its *replacement cost*. The relation between the prospective yield of a capital-asset and its supply price or replacement cost, i.e. the relation between the prospective yield of one more unit of that type of capital and the cost of producing that unit, furnishes us with the *marginal efficiency of capital* of that type. More precisely, I define the marginal efficiency of capital as being equal to that rate of discount which would make the present value of the series of annuities given by the returns expected from the capital-asset during its life just equal to its supply price. This gives us the marginal efficiencies of particular types of capital-assets. The greatest of these marginal efficiencies can then be regarded as the marginal efficiency of capital in general.

The reader should note that the marginal efficiency of capital is here defined in terms of the *expectation* of yield and of the *current* supply price of the capital-asset. It depends on the rate of return expected to be obtainable on money if it were invested in a *newly* produced asset; not on the historical result of what an investment has yielded on its original cost if we look back on its record after its life is over.

If there is an increased investment in any given type of capital during any period of time, the marginal efficiency of that type of capital will diminish as the investment in it is increased, partly because the prospective yield will fall as the supply of that type of capital is increased, and partly because, as a rule, pressure on the facilities for producing

that type of capital will cause its supply price to increase; the second of these factors being usually the more important in producing equilibrium in the short run, but the longer the period in view the more does the first factor take its place. Thus for each type of capital we can build up a schedule, showing by how much investment in it will have to increase within the period, in order that its marginal efficiency should fall to any given figure. We can then aggregate these schedules for all the different types of capital, so as to provide a schedule relating the rate of aggregate investment to the corresponding marginal efficiency of capital in general which that rate of investment will establish. We shall call this the investment demand-schedule; or, alternatively, the schedule of the marginal efficiency of capital.

Now it is obvious that the actual rate of current investment will be pushed to the point where there is no longer any class of capital-asset of which the marginal efficiency exceeds the current rate of interest. In other words, the rate of investment will be pushed to the point on the investment demand-schedule where the marginal efficiency of capital in general is equal to the market rate of interest.

The same thing can also be expressed as follows. If Q_r is the prospective yield from an asset at time r , and d_r is the present value of 1 deferred r years at the current rate of interest, $Q_r d_r$ is the demand price of the investment; and investment will be carried to the point where $Q_r d_r$ becomes equal to the supply price of the investment as defined above. If, on the other hand, $Q_r d_r$ falls short of the supply price, there will be no current investment in the asset in question.

It follows that the inducement to invest depends partly on the investment demand-schedule and partly on the rate of interest.

How is the above definition of the marginal efficiency of capital related to common usage? The *Marginal Productivity* or *Yield* or *Efficiency* or *Utility* of Capital is familiar terms which we have all frequently used. But it is not easy by searching the literature of economics to find a clear statement of what economists have usually intended by these terms.

There are at least three ambiguities to clear up. There is, to begin with, the ambiguity whether we are concerned with the increment of physical product per unit of time due to the employment of one more physical unit of capital, or with the increment of

value due to the employment of one more value unit of capital. The former involves difficulties as to the definition of the physical unit of capital, which I believe to be both insoluble and unnecessary. It is, of course, possible to say that ten labourers will raise more wheat from a given area when they are in a position to make use of certain additional machines; but I know no means of reducing this to an intelligible arithmetical ratio which does not bring in values. Nevertheless many discussions of this subject seem to be mainly concerned with the physical productivity of capital in some sense, though the writers fail to make them clear.

Secondly, there is the question whether the marginal efficiency of capital is some absolute quantity or a ratio. The contexts in which it is used and the practice of treating it as being of the same dimension as the rate of interest seem to require that it should be a ratio. Yet it is not usually made clear what the two terms of the ratio are supposed to be.

Finally, there is the distinction, the neglect of which has been the main cause of confusion and misunderstanding, between the increment of value obtainable by using an additional quantity of capital in the existing situation, and the series of increments which it is expected to obtain over *the whole life* of the additional capital asset; i.e. the distinction between Q_1 and the complete series $Q_1, Q_2, \dots, Q_r, \dots$. This involves the whole question of the place of expectation in economic theory. Most discussions of the marginal efficiency of capital seem to pay no attention to any member of the series except Q_1 . Yet this cannot be legitimate except in a static theory, for which all the Q 's are equal. The ordinary theory of distribution, where it is assumed that capital is getting *now* its marginal productivity (in some sense or other), is only valid in a stationary state. The aggregate current return to capital has no direct relationship to its marginal efficiency; whilst its current return at the margin of production (*i.e.* the return to capital which enters into the supply price of output) is its marginal user cost, which also has no close connection with its marginal efficiency.

There is, as I have said above, a remarkable lack of any clear account of the matter. At the same time I believe that the definition which I have given above is fairly close to what Marshall intended to mean by the term. The phrase which Marshall himself uses is "marginal net efficiency" of a factor of production; or, alternatively, the "marginal utility of capital". The following is a summary of the most relevant passage which I can

find in his *Principles* (6th ed. pp. 519-520). I have run together some non-consecutive sentences to convey the gist of what he says:

"In a certain factory extra 100 worth of machinery can be applied so as not to involve any other extra expense, and so as to add annually 3 worth to the net output of the factory after allowing for its own wear and tear. If the investors of capital push it into every occupation in which it seems likely to gain a high reward; and if, after this has been done and equilibrium has been found, it still pays and only just pays to employ this machinery, we can infer from this fact that the yearly rate of interest is 3 per cent. But illustrations of this kind merely indicate part of the action of the great causes which govern value. They cannot be made into a theory of interest, any more than into a theory of wages, without reasoning in a circle. . . Suppose that the rate of interest is 3 per cent. per annum on perfectly good security; and that the hat-making trade absorbs a capital of one million pounds. This implies that the hat-making trade can turn the whole million pounds' worth of capital to so good account that they would pay 3 per cent. per annum net for the use of it rather than go without any of it. There may be machinery which the trade would have refused to dispense with if the rate of interest had been 20 per cent. per annum. If the rate had been 10 per cent., more would have been used; if it had been 6 per cent., still more; if 4 per cent. still more; and finally, the rate being 3 per cent., they use more still. When they have this amount, the marginal utility of the machinery, *i.e.* the utility of that machinery which it is only just worth their while to employ, is measured by 3 per cent."

It is evident from the above that Marshall was well aware that we are involved in a circular argument if we try to determine along these lines what the rate of interest actually is. In this passage he appears to accept the view set forth above, that the rate of interest determines the point to which new investment will be pushed, given the schedule of the marginal efficiency of capital. If the rate of interest is 3 per cent, this means that no one will pay 100 for a machine unless he hopes thereby to add 3 to his annual net output after allowing for costs and depreciation.

Although he does not call it the "marginal efficiency of capital", Professor Irving Fisher has given in his *Theory of Interest* (1930) a definition of what he calls "the rate of return over cost" which is identical with my definition. "The rate of return over cost", he

writes, "is that rate which, employed in computing the present worth of all the costs and the present worth of all the returns, will make these two equal." Professor Fisher explains that the extent of investment in any direction will depend on a comparison between the rate of return over cost and the rate of interest. To induce new investment "the rate of return over cost must exceed the rate of interest". "This new magnitude (or factor) in our study plays the central role on the investment opportunity side of interest theory." Thus Professor Fisher uses his "rate of return over cost" in the same sense and for precisely the same purpose as I employ "the marginal efficiency of capital".

The most important confusion concerning the meaning and significance of the marginal efficiency of capital has ensued on the failure to see that it depends on the *prospective* yield of capital, and not merely on its current yield. This can be best illustrated by pointing out the effect on the marginal efficiency of capital of an expectation of changes in the prospective cost of production, whether these changes are expected to come from changes in labour cost, *i.e.* in the wage-unit, or from inventions and new technique. The output from equipment produced to-day will have to compete, in the course of its life, with the output from equipment produced subsequently, perhaps at a lower labour cost, perhaps by an improved technique, which is content with a lower price for its output and will be increased in quantity until the price of its output has fallen to the lower figure with which it is content. Moreover, the entrepreneur's profit (in terms of *money*) from equipment, old or new, will be reduced, if all output comes to be produced cheaply. In so far as such developments are foreseen as probable, or even as possible, the marginal efficiency of capital produced to-day is appropriately diminished.

This is the factor through which the expectation of changes in the value of money influences the volume of current output. The expectation of a fall in the value of money stimulates investment, and hence employment generally, because it raises the schedule of the marginal efficiency of capital, *i.e.* the investment demand-schedule; and the expectation of a rise in the value of money is depressing, because it lowers the schedule of the marginal efficiency of capital.

This is the truth which lies behind Professor Irving Fisher's theory of what he originally called "Appreciation and Interest", the distinction between the money rate of interest and the real rate of interest where the latter is equal to the former after correction

for changes in the value of money. It is difficult to make sense of this theory as stated, because it is not clear whether the change in the value of money is or is not assumed to be foreseen. There is no escape from the dilemma that, if it is not foreseen, there will be no effect on current affairs; whilst, if it is foreseen, the prices of existing goods will be forthwith so adjusted that the advantages of holding money and of holding goods are again equalised, and it will be too late for holders of money to gain or to suffer a change in the rate of interest which will offset the prospective change during the period of the loan in the value of the money lent. For the dilemma is not successfully escaped by Professor Pigou's expedient of supposing that the prospective change in the value of money is foreseen by one set of people but not foreseen by another.

The mistake lies in supposing that it is the rate of interest on which prospective changes in the value of money will directly react, instead of the marginal efficiency of a given stock of capital. The prices of *existing* assets will always adjust themselves to changes in expectation concerning the prospective value of money. The significance of such changes in expectation lies in their effect on the readiness to produce *new* assets through their reaction on the marginal efficiency of capital. The stimulating effect of the expectation of higher prices is due, not to its raising the rate of interest (that would be a paradoxical way of stimulating output, in so far as the rate of interest rises, the stimulating effect is to that extent offset), but to its raising the marginal efficiency of given stock of capital. If the rate of interest were to rise *pari passu* with the m efficiency of capital, there would be no stimulating effect from the expectation prices. For the stimulus to output depends on the marginal efficiency of a given stock of capital rising *relatively* to the rate of interest. Indeed Professor Fisher's theory could be best re-written in terms of a "real rate of interest" defined as being the rate of interest which would have to rule, consequently on a change in the state of expectation as to the future value of money, in order that this change should have no effect on current output.

It is worth noting that an expectation of a future fall in the rate of interest will have the effect of *lowering* the schedule of the marginal efficiency of capital; since it means that the output from equipment produced to-day will have to compete during part of its life with the output from equipment which is content with a lower return. This expectation will have no great depressing effect, since the expectations, which are held

concerning the complex of rates of interest for various terms which will rule in the future. will be partially reflected in the complex of rates of interest which rule to-day. Nevertheless there may be some depressing effect, since the output from equipment produced to-day, which will emerge towards the end of the life of this equipment, may have to compete with the output of much younger equipment which is content with a lower return because of the lower rate of interest which rules for periods subsequent to the end of the life of equipment produced to-day.

It is important to understand the dependence of the marginal efficiency of a given stock of capital on changes in expectation, because it is chiefly this dependence which renders the marginal efficiency of capital subject to the somewhat violent fluctuations which are the explanation of the Trade Cycle.

Two types of risk affect the volume of investment which has not commonly been distinguished, but which it is important to distinguish. The first is the entrepreneur's or borrower's risk and arises out of doubts in his own mind as to the probability of his actually earning the prospective yield for which he hopes. If a man is venturing his own money, this is the only risk which is relevant.

But where a system of borrowing and lending exists, by which I mean the granting of loans with a margin of real or personal security, a second type of risk is relevant which we may call the lender's risk. This may be due either to moral hazard, i.e. voluntary default or other means of escape, possibly lawful, from the fulfilment of the obligation, or to the possible insufficiency of the margin of security, i.e. involuntary default due to the disappointment of expectation. A third source of risk might be added, namely, a possible adverse change in the value of the monetary standard which renders a money-loan to this extent less secure than a real asset, though all or most of this should be already reflected, and therefore absorbed, in the price of durable real assets.

Now the first type of risk is, in a sense, a real social cost, though susceptible to diminution by averaging as well as by an increased accuracy of foresight. The second, however, is a pure addition to the cost of investment which would not exist if the borrower and lender was the same person. Moreover, it involves in part a duplication of a proportion of the entrepreneur's risk, which is added to the public rate of interest to give the minimum prospective yield which will induce the investment. For if a venture is

a risky one, the borrower will require a wider margin between his expectation of yield and the rate of interest at which he will think it worth his while to borrow; whilst the very same reason will lead the lender to require a wider margin between what he charges and the pure rate of interest in order to induce him to lend (except where the borrower is so strong and wealthy that he is in a position to offer an exceptional margin of security). The hope of a very favourable outcome, which may balance the risk in the mind of the borrower, is not available to solace the lender.

This duplication of allowance for a portion of the risk has not hitherto been emphasised, so far as I am aware; but it may be important in certain circumstances. During a boom the popular estimation of the magnitude of both these risks, both borrower's risk and lender's risk, is apt to become unusually and imprudently low.

The schedule of the marginal efficiency of capital is of fundamental importance because it is mainly through this factor (much more than through the rate of interest) that the expectation of the future influences the present. The mistake of regarding the marginal efficiency of capital primarily in terms of the *current* yield of capital equipment, which would be correct only in the static state where there is no changing future to influence the present, has had the result of breaking the theoretical link between to-day and to-morrow. Even the rate of interest is, virtually, a *current* phenomenon; and if we reduce the marginal efficiency of capital to the same status, we cut ourselves off from taking any direct account of the influence of the future in our analysis of the existing equilibrium.

The fact that the assumptions of the static state often underlie present-day economic theory, imports into it a large element of unreality. But the introduction of the concepts of user cost and of the marginal efficiency of capital, as defined above, will have the effect, I think, of bringing it back to reality, whilst reducing to a minimum the necessary degree of adaptation.

It is by reason of the existence of durable equipment that the economic future is linked to the present. It is, therefore, consonant with, and agreeable to, our broad principles of thought, that the expectation of the future should affect the present through the demand price for durable equipment.

2.4 THE MULTIPLIER ACCELERATOR AND INVESTMENT BEHAVIOUR

An initial change in aggregate demand can have a much greater final impact on the level of equilibrium national income. This is commonly known as the multiplier effect and it comes about because injections of demand into the circular flow of income stimulate further rounds of spending – in other words “one person’s spending is another’s income” – and this can lead to a much bigger effect on equilibrium output and employment.

Consider a £300 million increase in business capital investment – for example created when an overseas company decides to build a new production plant in the UK. This will set off a chain reaction of increases in expenditures. Firms who produce the capital goods that are purchased will experience an increase in their incomes and profits. If they in turn, collectively spend about $\frac{3}{5}$ of that additional income, then £180m will be added to the incomes of others.

At this point, total income has grown by $(£300m + (0.6 \times £300m))$.

The sum will continue to increase as the producers of the additional goods and services realize an increase in their incomes, of which they in turn spend 60% on even more goods and services.

The increase in total income will then be $(£300m + (0.6 \times £300m) + (0.6 \times £180m))$.

The process can continue indefinitely. But each time, the additional rise in spending and income is a fraction of the previous addition to the circular flow.

Multiplier effects can be seen when new investment and jobs are attracted into a particular town, city or region. The final increase in output and employment can be far greater than the initial injection of demand because of the inter-relationships within the circular flow.

2.4.1 The Multiplier and Keynesian Economics

The concept of the multiplier process became important in the 1930s when John Maynard Keynes suggested it as a tool to help governments to achieve full employment. This macroeconomic “demand-management approach”, designed to help overcome a

shortage of business capital investment, measured the amount of government spending needed to reach a level of national income that would prevent unemployment.

The higher is the propensity to consume domestically produced goods and services, the greater is the multiplier effect. The government can influence the size of the multiplier through changes in direct taxes. For example, a cut in the basic rate of income tax will increase the amount of extra income that can be spent on further goods and services.

Another factor affecting the size of the multiplier effect is the propensity to purchase imports. If, out of extra income, people spend money on imports, this demand is not passed on in the form of extra spending on domestically produced output. It leaks away from the circular flow of income and spending.

The multiplier process also requires that there is sufficient spare capacity in the economy for extra output to be produced. If short-run aggregate supply is inelastic, the full multiplier effect is unlikely to occur, because increases in AD will lead to higher prices rather than a full increase in real national output. In contrast, when SRAS is perfectly elastic a rise in aggregate demand causes a large increase in national output.

Differences in the size of the multiplier effect

AD1 - AD2 is an outward shift of AD when short run aggregate supply is highly elastic. This leads to a large rise in national output and a large multiplier effect

AD3 - AD4 shows a further outward shift in aggregate demand, but where aggregate supply is inelastic - the multiplier effect is smaller because there is less spare capacity available to meet the increase in demand

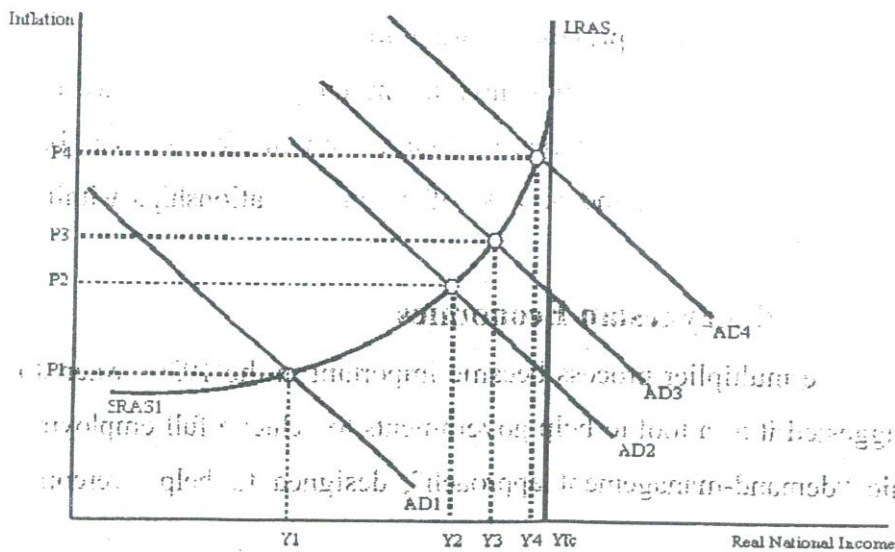


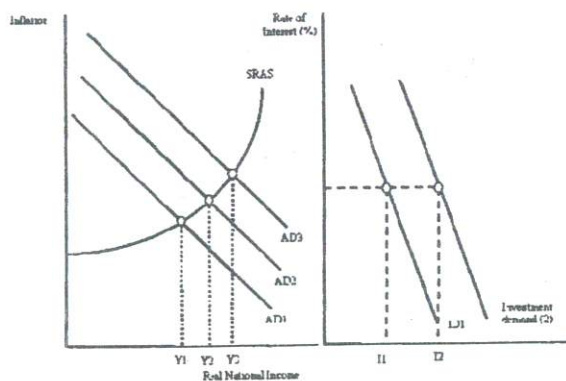
Figure 6

The construction boom and multiplier effects

A study has found that the British construction sector alone has driven a fifth of UK GDP growth in the past year and 34% of net job creation in the past two years. The construction boom has been caused by the combination of large projects like Terminal 5, the Channel Tunnel Rail Link, Wembley Stadium and the Scottish Parliament with a revival in house building, heavy expenditure by the public sector on new schools and hospitals and a surge in home improvement expenditure.

The study provides compelling evidence on the multiplier effects of major capital investment projects. 'One characteristic of construction activity is that it feeds through to many other related businesses. It has "backward linkages" into the likes of building materials; steel, architectural services, legal services and insurance, and most of these linkages tend to result in jobs close to home. This makes a boom in construction peculiarly powerful in fuelling expansion in the economy - for a given lift in building orders, the multiplier effect may be well over two. This means that every building job created will generate at least two others in related areas and in downstream activities such as retailing, which benefits when building workers spend their wages. Other industries, particularly those where much of the output value comes in the form of imported components, might have a multiplier of less than 1.5 for new projects'.

The accelerator effect



Aggregate demand and the accelerator effect
 The strength of demand for goods and services and in particular the level of consumer spending has an impact on the planned level of capital investment spending by private sector businesses
 When consumption grows strongly, this increases short run output and it can lead to higher prices and profits for producers who will be operating with less spare capacity. If business confidence and profits are high, we can see an accelerator effect at work with a rise in planned capital investment at each prevailing rate of interest. This is shown in the right hand diagram above.

Figure 7

Planned capital investment by private sector businesses is linked to the growth of demand for goods and services. When consumer or export demand is rising strongly, businesses may increase investment to expand their production capacity and meet the extra demand. This process is known as the accelerator effect. But the accelerator effect can work in the other direction! A slowdown in consumer demand can create excess capacity and may lead to a fall in planned investment demand. A good example of this in recent years is the telecommunications industry. Capital investment in this sector surged to record highs in the second half of the 1990s, driven by a fast pace of technological advance and huge increases in the ICT budgets of corporations, small-to-medium sized businesses, and extra capital investment by the public sector (including education and health).

The telecommunications industry invested giant sums in building bigger and faster networks, but demand has slowed in the first three of the decade, leaving the industry with a vast amount of spare capacity (an under-utilisation of resources). Capital investment spending in the telecommunications industry has fallen sharply in the last three years – the accelerator mechanism working in reverse.

2.4.2 The Simple Multiplier Model

Suppose a factory with a payroll of \$500,000 locates in a Lemmingville, a typical suburban community. Suppose further that the \$500,000 is the only money that the factory spends in the community, that all employees live in Lemmingville, and that each person who lives there spends exactly one half of his income locally. By how much will the income of Lemmingville rise as a result of the new factory?

The \$500,000 will be an addition to Lemmingville income. But the story does not end here because, by assumption, the people who earn the payroll will spend one half of the payroll, or \$250,000, in the community. This \$250,000 will become income for the shopkeepers, plumbers, lawyers, teachers, etc. Thus Lemmingville income will rise by at least \$750,000. But the story does not end here either. The shopkeepers, plumbers, etc. who received the \$250,000 will in turn spend one half of their new income locally, and this \$125,000 will become income for other people in the community. Total Lemmingville income is now \$875,000. The process will continue on and on, and as it does, total income will approach \$1,000,000.

Notice that the initial half million in income expands to one million once in the system. There is a multiplier effect that is similar to the multiplier effect in the model of contingent behavior. The size of the multiplier in our suburb depends on the percentage of income people spend within the community. The smaller the percentage, the more quickly the extra income leaks out of the economy and the smaller the multiplier.

The Keynesian multiplier model applies to the national economy the logic by which a new factory can increase a town's income by a multiple of its payroll. Central in this model is an assumption about how people spend, the consumption function. The consumption function says that the amount people spend depends on their income, and that as income increases, so does consumption.

The table below illustrates a consumption function. It says that if people expect incomes of \$10,000, they will spend \$12,500. This amount of spending is possible if people plan to borrow or to dissave. (To dissave means to sell assets.) The table says that when expected income is \$30,000, people will spend \$27,500, which means that they plan to save \$2,500.

Expected Income	Consumption	Expected Savings
\$10,000	\$12,500	-\$2,500
12,000	14,000	-2,000
20,000	20,000	0
30,000	27,500	2,500

The table shows that if expected income rises by \$2,000, from \$10,000 to \$12,000, people will increase their spending by \$1,500, or that they will only spend three-fourths of additional income that they expect to receive. This fraction of additional income that people spend has a special name, the marginal propensity to consume (or mpc for short). In the table above the mpc is always three-fourths. Thus if income increases by \$8000, from \$12,000 to \$20,000, people increase spending by \$6,000, from \$14,000 to \$20,000.

The marginal propensity to consume can be computed with the formula:

(1) $MPC = (\text{change in consumption}) \div (\text{change in income})$

In addition, economists often talk of the marginal propensity to save, which is the fraction of additional income that people save. Since people either save or consume additional income, the sum of the marginal propensity to save and the marginal propensity to consume should equal one.

The value of the marginal propensity to consume should be greater than zero and less than one. A value of zero would indicate that none of additional income would be spent; all would be saved. A value greater than one would mean that if income increased by \$1.00, consumption would go up by more than a dollar, which would be unusual behavior. For some people a mpc of 1 is reasonable, meaning that they spend every additional dollar they get, but this is not true for all people, so if we want a consumption function that tells us what people on the average do, a value less than one is reasonable.

The consumption function can also be illustrated with an equation or a graph. The equation that gives the consumption function in the table above is:

(2) $\text{Consumption} = \$5000 + (3/4)(\text{Expected Income})$.

If people expect an income of \$10,000, this equation says consumption will be:

(3) $\text{Consumption} = \$5000 + (3/4)(\$10000) = \$5000 + \$7500 = \$12500$

which is the same result that the table contains. Notice that one can see the marginal propensity to consume in this equation. It is the fraction $3/4$.

Graphing the consumption function presented above in the table and equation yields a straight line with a slope of $3/4$ shown below. If the slope of the consumption function, which is the mpc, never changes, the consumption function is linear. If the mpc changes as income changes, then the consumption function will be a curved line, or a nonlinear consumption function. The \$5,000 term in equation 2 is shown on the graph as the intercept, which indicates the amount of consumption if expected income is zero.

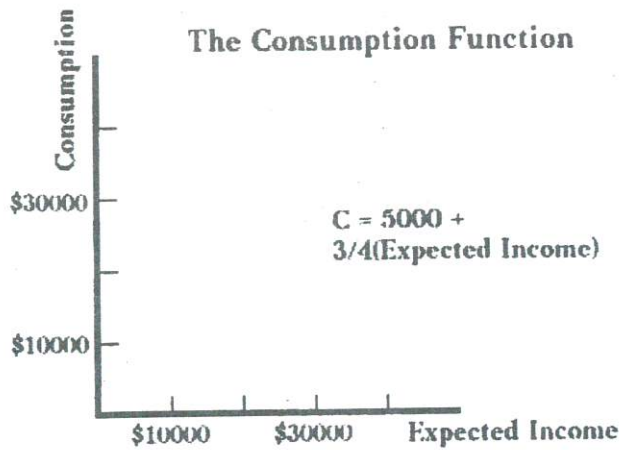
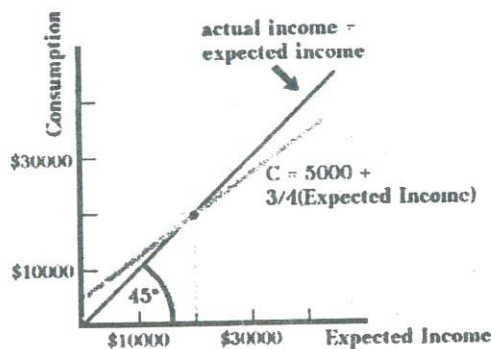


Figure 8

When will this model be in equilibrium? To answer this, recall that spending by one person is income for another. Because so far we have assumed that consumption is the only form of spending, the amount of consumption spending will equal actual income. If people expect income of \$10,000 and spend \$12,500, actual income will exceed expected income. It is reasonable to suppose that as a result people will change their expectations, and thus their behavior. The logical equilibrium condition in this model is that expected income should equal actual income.

In the table we see that \$20,000 will be equilibrium income. When people expect income to be \$20,000, they act in a way to make their expectations come true. We can show the solution on a graph by adding a line that shows all the points for which actual income equals expected income. These points will form a straight line that will bisect the graph, shown below as a 45-degree line. Equilibrium income occurs in the model when the spending line intersects the 45-degree line.



The 45-degree line shows where equilibrium lies

2.5 INFLATION AND INVESTMENT DECISIONS

Inflation is the most commonly used economic term in the popular media. A Nexis search in 1996 found 872,000 news stories over the past twenty years that used the word inflation. "Unemployment" ran a distant second. Public concern about inflation generally heats up in step with inflation itself. Though economists do not always agree about when inflation starts to interfere with market signals, the public tends to express serious alarm once the inflation rate rises above 5 or 6 percent. Public opinion polls show minimal concern about rising prices during the early 1960s, as inflation was low. Concern rose with inflation in the late 1960s and early 1970s. When inflation twice surged to double-digit levels in the mid and late 1970s, Americans named it public enemy number one. Since the late 1980s, public anxiety has abated along with inflation itself.

Yet even when inflation is low, Americans tend to perceive a morality tale in its effects. A recent survey by Yale economist Robert Shiller found that many Americans view differences in prices over time as a reflection of fundamental changes in the values of our society, rather than of purely economic forces.

But what effect does inflation have on the economy and on investment in particular? Inflation causes many distortions in the economy. It hurts people who are retired and living on a fixed income. When prices rise these consumers cannot buy as much as they could previously. This discourages savings due to the fact that the money is worth more presently than in the future. This expectation reduces economic growth because the economy needs a certain level of savings to finance investments which boosts economic growth. Also, inflation makes it harder for businesses to plan for the future. It is very difficult to decide how much to produce, because businesses cannot predict the demand for their product at the higher prices they will have to charge in order to cover their costs. High inflation not only disrupts the operation of a nation's financial institutions and markets, it also discourages their integration with the rest of the world's markets. Inflation causes uncertainty about future prices, interest rates, and exchange rates, and this in turn increases the risks among potential trade partners, discouraging trade. As far as commercial banking is concerned, it erodes the value of the depositor's

savings as well as that of the bank's loans. The uncertainty associated with inflation increases the risk associated with the investment and production activity of firms and markets.

The impact inflation has on a portfolio depends on the type of securities held there. Investing only in stocks one may not have to worry about inflation. In the long run, a company's revenue and earnings should increase at the same pace as inflation. But inflation can discourage investors by reducing their confidence in investments that take a long time to mature. The main problem with stocks and inflation is that a company's returns can be overstated. When there is high inflation, a company may look like it's doing a great job, when really inflation is the reason behind the growth. In addition to this, when analyzing the earnings of a firm, inflation can be problematic depending on what technique the company are uses to value its inventory.

The effect of inflation on investment occurs directly and indirectly. Inflation increases transactions and information costs, which directly inhibits economic development. For example, when inflation makes nominal values uncertain, investment planning becomes difficult. Individuals may be reluctant to enter into contracts when inflation cannot be predicted making relative prices uncertain. This reluctance to enter into contracts over time will inhibit investment which will affect economic growth. In this case inflation will inhibit investment and could result in financial recession (Hellerstein, 1997). In an inflationary environment intermediaries will be less eager to provide long-term financing for capital formation and growth. Both lenders and borrowers will also be less willing to enter long-term contracts. High inflation is often associated with financial repression as governments take actions to protect certain sectors of the economy. For example, interest rate ceilings are common in high inflation environments. Such controls lead to inefficient allocations of capital that inhibit economic growth (Morley, 1971).

The hardest hit from inflation falls on the fixed-income investors. For example, suppose one year ago an investor buys a \$1,000 T-bill that yields 10%. When they collect the \$1,100 owed to them, is their \$100 (10%) return real? No, assuming inflation was positive for the year, the purchasing power of the investor has fallen and thus so has the real return. The amount inflation has taken out of the return has to be taken into

account. If inflation was 4%, then the return is really 6%. By the Fisher equation (nominal interest rate – inflation rate = real interest rate) we see the difference between the nominal interest rate and the real interest rate. The nominal interest rate is the growth rate of the investors' money, while the real interest rate is the growth of their purchasing power. In other words, the real rate of interest is the nominal rate reduced by the rate of inflation. Here the nominal rate is 10% and the real rate is 6% ($10\% - 4\% = 6\%$).

With a regular Treasury bond, interest payments are fixed, and only the principal fluctuates with the movement of interest rates. The yield on a regular bond incorporates investors' expectations for inflation. So at times of low inflation, yields are generally low, and they generally rise when inflation does. Treasury Inflation-Protected Securities are like any other Treasury bills, except that the principal and coupon payments are tied to the consumer price index (CPI) and increased to compensate for any inflation. With other treasury notes, when you buy an inflation-protected or inflation-indexed security, you receive interest payments every six months and a principal payment when the security matures. The difference is that the coupon payments and underlying principal are automatically increased to compensate for inflation by tracking the consumer price index (CPI). Treasury Inflation-Protected Securities are the safest bonds in which to invest. This is because the real rate of return, which represents the growth of purchasing power, is guaranteed. The downside is that because of this safety and the lower risk, inflation-protected bonds offer a lower return.

It has been shown that inflation affects investment in several ways, mostly inhibiting economic growth. The source of inflation is money and the supply of it. Investors need to be able to expect returns in order for them to make financial decisions. If people cannot trust money then they are less likely to engage in business relationships. This results in lower investment, production and less socially positive interactions. Among other effects, people may start to attempt to trade by other, less efficient, means in order to avoid the unpredictable price levels due to inflation.

2.6 POLICY MEASURES AND INVESTMENT

As noted, the classicals wanted to balance the government budget. To Keynes, this would exacerbate the underlying problem: following either policy would raise saving

(broadly defined) and thus lower the demand for both products and labor. Keynes' ideas influenced Franklin D. Roosevelt's view that insufficient buying-power caused the Depression. During his presidency, Roosevelt adopted some aspects of Keynesian economics, especially after 1937, when, in the depths of the Depression, the United States suffered from recession yet again following fiscal contraction. But to many the true success of Keynesian policy can be seen at the onset of World War II, which provided a kick to the world economy, removed uncertainty, and forced the rebuilding of destroyed capital. Keynesian ideas became almost official in social-democratic Europe after the war and in the U.S. in the 1960s.

Keynes' theory suggested that active government policy could be effective in managing the economy. Rather than seeing unbalanced government budgets as wrong, Keynes advocated what has been called countercyclical fiscal policies, that is policies which acted against the tide of the business cycle: deficit spending when a nation's economy suffers from recession or when recovery is long-delayed and unemployment is persistently high—and the suppression of inflation in boom times by either increasing taxes or cutting back on government outlays. He argued that governments should solve problems in the short run rather than waiting for market forces to do it in the long run, because "in the long run, we are all dead."

This contrasted with the classical and neoclassical economic analysis of fiscal policy. Fiscal stimulus (deficit spending) could actuate production. But to these schools, there was no reason to believe that this stimulation would outrun the side-effects that "crowd out" private investment: first, it would increase the demand for labor and raise wages, hurting profitability; Second, a government deficit increases the stock of government bonds, reducing their market price and encouraging high interest rates, making it more expensive for business to finance fixed investment. Thus, efforts to stimulate the economy would be self-defeating.

The Keynesian response is that such fiscal policy is only appropriate when unemployment is persistently high, above what is now termed the Non-Accelerating Inflation Rate of Unemployment, or "NAIRU". In that case, crowding out is minimal. Further, private investment can be "crowded in": fiscal stimulus raises the market for business output, raising cash flow and profitability, spurring business optimism. To

Keynes, this accelerator effect meant that government and business could be complements rather than substitutes in this situation. Second, as the stimulus occurs, gross domestic product rises, raising the amount of saving, helping to finance the increase in fixed investment. Finally, government outlays need not always be wasteful: government investment in public goods that will not be provided by profit-seekers will encourage the private sector's growth. That is, government spending on such things as basic research, public health, education, and infrastructure could help the long-term growth of potential output.

A Keynesian economist might point out that classical and neoclassical theory does not explain why firms acting as "special interests" to influence government policy are assumed to produce a negative outcome, while those same firms acting with the same motivations outside of the government are supposed to produce positive outcomes. Libertarians counter that because both parties consent, free trade increases net happiness, but government imposes its will by force, decreasing happiness. Therefore firms that manipulate the government do net harm, while firms that respond to the free market do net good.

In Keynes' theory, there must be significant slack in the labor market before fiscal expansion is justified. Both conservative and some neoliberal economists question this assumption, unless labor unions or the government "meddle" in the free market, creating persistent supply-side or classical unemployment. Their solution is to increase labor-market flexibility, e.g., by cutting wages, busting unions, and deregulating business.

Deficit spending is not Keynesianism. Keynesianism recommends counter-cyclical policies to smooth out fluctuations in the business cycle. An example of a counter-cyclical policy is raising taxes to cool the economy and to prevent inflation when there is abundant demand-side growth, and engaging in deficit spending on labor-intensive infrastructure projects to stimulate employment and stabilize wages during economic downturns. Classical economics, on the other hand, argues that one should cut taxes when there are budget surpluses, and cut spending—or, less likely, increase taxes—during economic downturns. Keynesian economists believe that adding to profits and incomes during boom cycles through tax cuts, and removing income and profits from the economy through cuts in spending and/or increased taxes during downturns, tends to

exacerbate the negative effects of the business cycle. This effect is especially pronounced when the government controls a large fraction of the economy, and is therefore one reason fiscal conservatives advocate a much smaller government.

Activity 2

1. What in your view is the relevance of investment in the Keynes theory of employment?
2. Discuss the concept of excessive savings with suitable examples.
3. Explain the term 'multiplier effect'. What do you know by accelerator effect?
4. Discuss various effects of inflation on investment decisions.

2.7 SUMMARY

The unit threw light on investment in relevance to Keynes theory. After brief introduction excessive savings were explained in detail. It was made clear that an initial change in aggregate demand can have a much greater final impact on the level of equilibrium national income. This is commonly known as the multiplier effect. the marginal efficiency of capital as being equal to the rate of discount which would make the present value of the series of annuities given by the returns expected from the capital asset during its life just equal its supply price. The effect of inflation on investment occurs directly and indirectly. Inflation increases transactions and information costs, which directly inhibits economic development. Later it was discussed that Keynes' theory suggests active government policy as an effective tool in managing the economy.

2.8 FURTHER READINGS

- "Capital Theory and Investment Behavior", 1963, American Economics Review, Vol 53
- "The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle". Was firstly published in German in 1911.
- Muller, Jerry Z., 2002. The Mind and the Market: Capitalism in Western Thought. Anchor Books.

UNIT 3

BUSINESS CYCLES

Objectives

After studying this unit you should be able to:

- Understand the concept and various approaches to business cycles
- Analyze the Schumpeter's contribution to the concept of business cycles.
- Have the knowledge of Kaldor's non linear cycle
- Know Samuelson and Hicks perceptions over business cycles
- Appreciate the implication of monetary and fiscal policies to control business cycles in different nations.

Structure

- 3.1 Introduction
- 3.2 Approaches to business cycles
- 3.3 Schumpeter and business cycles
- 3.4 Kaldor's non linear cycles
- 3.5 Samuelson and Hicks model
- 3.6 Implication of policies and control of business cycles
- 3.7 Summary
- 3.8 Further readings

3.1 INTRODUCTION

The term business cycle (or economic cycle) refers to economy-wide fluctuations in production or economic activity over several months or years. These fluctuations occur around a long-term growth trend, and typically involve shifts over time between periods of relatively rapid economic growth (expansion or boom), and periods of relative stagnation or decline (contraction or recession).

These fluctuations are often measured using the growth rate of real gross domestic product. Despite being termed cycles, most of these fluctuations in economic activity do not follow a mechanical or predictable periodic pattern.

In this unit we are going to study some of the important theories and approaches to business cycles.

Defining business cycles

In 1946, economists Arthur F. Burns and Wesley C. Mitchell provided the now standard definition of business cycles in their book *Measuring Business Cycles*:

Business cycles are a type of fluctuation found in the aggregate economic activity of nations that organize their work mainly in business enterprises: a cycle consists of expansions occurring at about the same time in many economic activities, followed by similarly general recessions, contractions, and revivals which merge into the expansion phase of the next cycle; in duration, business cycles vary from more than one year to ten or twelve years; they are not divisible into shorter cycles of similar characteristics with amplitudes approximating their own.

According to A. F. Burns:

Business cycles are not merely fluctuations in aggregate economic activity. The critical feature that distinguishes them from the commercial convulsions of earlier centuries, or from the seasonal and other short term variations of our own age is that the fluctuations are widely diffused over the economy--its industry, its commercial dealings, and its tangles of finance. The economy of the western world is a system of closely interrelated parts. He who would understand business cycles must master the workings of an economic system organized largely in a network of free enterprises searching for profit. The problem of how business cycles come about is therefore inseparable from the problem of how a capitalist economy functions.

In the United States, it is generally accepted that the National Bureau of Economic Research (NBER) is the final arbiter of the dates of the peaks and troughs of the business cycle. An expansion is the period from a trough to a peak. and a recession as the period from a peak to a trough. The NBER identifies a recession as "a significant decline in economic activity spread across the economy, lasting more than a few months, normally visible in real GDP, real income, employment, industrial production".

Cycles or fluctuations?

In recent years economic theory has moved towards the study of economic fluctuation rather than a 'business cycle' - though some economists use the phrase

'business cycle' as a convenient shorthand. For Milton Friedman calling the business cycle a "cycle" is a misnomer, because of its non-cyclical nature. Friedman believed that for the most part, excluding very large supply shocks, business declines are more of a monetary phenomenon.

Rational expectations theory states that no deterministic cycle can persist because it would consistently create arbitrage opportunities. Much economic theory also holds that the economy is usually at or close to equilibrium. These views led to the formulation of the idea that observed economic fluctuations can be modeled as shocks to a system.

In the tradition of Slutsky, business cycles can be viewed as the result of stochastic shocks that on aggregate form a moving average series. However, the recent research employing spectral analysis has confirmed the presence of business (Juglar) cycles in the world GDP dynamics at an acceptable level of statistical significance.

3.2 APPROACHES TO BUSINESS CYCLES

The explanation of fluctuations in aggregate economic activity is one of the primary concerns of macroeconomics. The most commonly used framework for explaining such fluctuations is Keynesian economics. In the Keynesian view, business cycles reflect the possibility that the economy may reach short-run equilibrium at levels below or above full employment. If the economy is operating with less than full employment, i.e., with high unemployment, Keynesian theory states that monetary policy and fiscal policy can have a positive role to play in smoothing the fluctuations of the business cycle.

There are a number of alternative heterodox economic theories of business cycles, largely associated with particular schools or theorists. There are also some divisions and alternative theories within mainstream economics, notably Real Business Cycle theory and credit-based explanations such as debt deflation and the Financial Instability Hypothesis.

3.2.1 Exogenous vs. endogenous

Within mainstream economics, the debate over external (exogenous) versus internal (endogenous) causes of the economic cycle is centuries long, with the classical school (now neo-classical) arguing for exogenous causes and the underconsumptionist

(now Keynesian) school arguing for endogenous causes. These may also broadly be classed as "supply-side" and "demand-side" explanations: supply-side explanations may be styled, following Say's law, as arguing that "supply creates its own demand", while demand-side explanations argue that effective demand may fall short of supply, yielding a recession or depression.

This debate has important policy consequences: proponents of exogenous causes of crises such as neoclassicals largely argue for minimal government policy or regulation (laissez faire), as absent these external shocks, the market functions, while proponents of endogenous causes of crises such as Keynesians largely argue for larger government policy and regulation, as absent regulation, the market will move from crisis to crisis. This division is not absolute – some classical (including Say) argued for government policy to mitigate the damage of economic cycles, despite believing in external causes, while Austrian School economists argue against government involvement as only worsening crises, despite believing in internal causes.

The view of the economic cycle as caused exogenously dates to Say's law, and much debate on endogeneity or exogeneity of causes of the economic cycle is framed in terms of refuting or supporting Say's law; this is also referred to as the "general glut" debate.

Until the Keynesian revolution in mainstream economics in the wake of the Great Depression, classical and neoclassical explanations (exogenous causes) were the mainstream explanation of economic cycles; following the Keynesian revolution, neoclassical macroeconomics was largely rejected. There has been some resurgence of neoclassical approaches in the form of RBC theory, but the mainstream view is largely Keynesian.

Mainstream economists working in the neoclassical tradition of Adam Smith and David Ricardo, as opposed to the Keynesian tradition, have usually viewed the departures of the harmonic working of the market economy as due to exogenous influences, such as the State or its regulations, labor unions, business monopolies, or shocks due to technology or natural causes (e.g. sunspots for William Stanley Jevons, planet Venus movements for Henry Ludwell Moore).

Contrarily, in the heterodox tradition of Jean Charles Léonard de Sismondi, Clement Juglar, and Marx the recurrent upturns and downturns of the market system are an endogenous characteristic of it.

The 19th century school of Underconsumptionism also posited endogenous causes for the business cycle, notably the paradox of thrift, and today this previously heterodox school has entered the mainstream in the form of Keynesian economics via the Keynesian revolution.

3.2.2 Keynesian

According to Keynesian economics, fluctuations in aggregate demand cause the economy to come to short run equilibrium at levels that are different from the full employment rate of output. These fluctuations express themselves as the observed business cycles. Keynesian models do not necessarily imply periodic business cycles. However, simple Keynesian models involving the interaction of the Keynesian multiplier and accelerator give rise to cyclical responses to initial shocks. Paul Samuelson's "oscillator model" is supposed to account for business cycles thanks to the multiplier and the accelerator. The amplitude of the variations in economic output depends on the level of the investment, for investment determines the level of aggregate output (multiplier), and is determined by aggregate demand (accelerator).

In the Keynesian tradition, Richard Goodwin accounts for cycles in output by the distribution of income between business profits and workers wages. The fluctuations in wages are almost the same as in the level of employment (wage cycle lags one period behind the employment cycle), for when the economy is at high employment, workers are able to demand rises in wages, whereas in periods of high unemployment, wages tend to fall. According to Goodwin, when unemployment and business profits rise, the output rises.

3.2.3 Credit/debt cycle

One alternative theory is that the primary cause of economic cycles is due to the credit cycle: the net expansion of credit (increase in private credit, equivalently debt, as a percentage of GDP) yields economic expansions, while the net contraction causes recessions, and if it persists, depressions. In particular, the bursting of speculative bubbles

is seen as the proximate cause of depressions, and this theory places finance and banks at the center of the business cycle.

A primary theory in this vein is the debt deflation theory of Irving Fisher, which he proposed to explain the Great Depression. A more recent complementary theory is the Financial Instability Hypothesis of Hyman Minsky, and the credit theory of economic cycles is often associated with Post-Keynesian economics such as Steve Keen.

Post-Keynesian economist Hyman Minsky has proposed an explanation of cycles founded on fluctuations in credit, interest rates and financial frailty, called the Financial Instability Hypothesis. In an expansion period, interest rates are low and companies easily borrow money from banks to invest. Banks are not reluctant to grant them loans, because expanding economic activity allows business increasing cash flows and therefore they will be able to easily pay back the loans. This process leads to firms becoming excessively indebted, so that they stop investing, and the economy goes into recession.

While credit causes have not been a primary theory of the economic cycle within the mainstream, they have gained occasional mention, such as (Eckstein & Sinai 1986), cited approvingly by (Summers 1986).

3.2.4 Real business cycle theory

Within mainstream economics, Keynesian views have been challenged by real business cycle models in which fluctuations are due to technology shocks. This theory is most associated with Finn E. Kydland and Edward C. Prescott, and more generally the Chicago school of economics (freshwater economics). They consider that economic crisis and fluctuations cannot stem from a monetary shock, only from an external shock, such as an innovation.

RBC theory has been categorically rejected by a number of mainstream economists in the Keynesian tradition, such as (Summers 1986) and Paul Krugman.

3.2.5 Politically-based business cycle

Another set of models tries to derive the business cycle from political decisions. The partisan business cycle suggests that cycles result from the successive elections of administrations with different policy regimes. Regime A adopts expansionary policies, resulting in growth and inflation, but is voted out of office when inflation becomes

unacceptably high. The replacement, Regime B, adopts contractionary policies reducing inflation and growth, and the downwards swing of the cycle. It is voted out of office when unemployment is too high, being replaced by Party A.

The political business cycle is an alternative theory stating that when an administration of any hue is elected, it initially adopts a contractionary policy to reduce inflation and gain a reputation for economic competence. It then adopts an expansionary policy in the lead up to the next election, hoping to achieve simultaneously low inflation and unemployment on Election Day.

The political business cycle theory is strongly linked to the name of Michał Kalecki who argued that no democratic government under capitalism would allow the persistence of full employment, so that recessions would be caused by *political* decisions. Persistent full employment would mean increasing workers' bargaining power to raise wages and to avoid doing unpaid labor, potentially hurting profitability. (He did not see this theory as applying under fascism, which would use direct force to destroy labor's power.) In recent years, proponents of the "electoral business cycle" theory have argued that incumbent politicians encourage prosperity before elections in order to ensure re-election—and make the citizens pay for it with recessions afterwards.

3.2.6 Marxian economics

For Marx the economy based on production of commodities to be sold in the market is intrinsically prone to crisis. In the Marxian view profit is the major engine of the market economy, but business (capital) profitability has a tendency to fall that recurrently creates crises, in which mass unemployment occurs, businesses fail, remaining capital is centralized and concentrated and profitability is recovered. In the long run these crises tend to be more severe and the system will eventually fail. Some Marxist authors such as Rosa Luxemburg viewed the lack of purchasing power of workers as a cause of a tendency of supply to be larger than demand, creating crisis, in a model that has similarities with the Keynesian one. Indeed a number of modern authors have tried to combine Marx's and Keynes's views. Others have contrarily emphasized basic differences between the Marxian and the Keynesian perspective: while Keynes saw capitalism as a system worth maintaining and susceptible to efficient regulation, Marx

viewed capitalism as a historically doomed system that cannot be put under societal control

3.2.7 Austrian school

Economists of the Austrian school argue that business cycles are caused by monetary expansion, which is often created by central banks and fractional reserve banks in modern economies. Austrian business cycle theory, following the work of Ludwig von Mises and Friedrich Hayek, points to the role of the interest rates as the price of investment capital, guiding investment decisions. They argue that in an unregulated (free-market) economy, without a central bank, interest rates reflect the actual time preference of lenders and borrowers. Some follow Knut Wicksell in calling this the "natural" interest rate. Austrian school economists argue that a central bank distorts this natural equilibrium. If the interest rate is held artificially low by the government or central bank, then the demand for loans will exceed the supply of willing lenders, and if the interest rate is artificially high, the opposite will occur. This pricing misinformation leads investors to misallocate capital, borrowing and investing either too much when interest rates are too low or too little when the rates are too high, in long-term projects. Periodic recessions are seen as necessary "corrections" following periods of monetary expansion. when unprofitable investments are liquidated, freeing capital for new investment. Depressions and recessions are positive forces in-so-much that they are the market's natural mechanism of undoing the misallocation of resources present during the "boom" or inflationary phase.

There are various critiques of Austrian business cycle theory, not least of which that the US suffered recurrent economic crises in the 19th century, most notably the Long Depression following the Panic of 1873, prior to the establishment of a US central bank in 1907. The historian Thomas Woods has attempted to explain that these earlier financial crises are in fact consistent with Austrian theory in his book Meltdown.

3.2.8 Mitigating

Most social indicators (mental health, crimes, suicides) worsen during economic recessions. As periods of economic stagnation are painful for the many who lose their jobs, there is often political pressure for governments to mitigate recessions. Since the

1940s, most governments of developed nations have seen the mitigation of the business cycle as part of the responsibility of government.

Since in the Keynesian view, recessions are caused by inadequate aggregate demand, when a recession occurs the government should increase the amount of aggregate demand and bring the economy back into equilibrium. This the government can do in two ways, firstly by increasing the money supply (expansionary monetary policy) and secondly by increasing government spending or cutting taxes (expansionary fiscal policy).

However, even according to Keynesian theory, managing economic policy to smooth out the cycle is a difficult task in a society with a complex economy. Some theorists, notably those who believe in Marxian economics, believe that this difficulty is insurmountable. Karl Marx claimed that recurrent business cycle crises were an inevitable result of the operations of the capitalistic system. In this view, all that the government can do is to change the *timing* of economic crises. The crisis could also show up in a different *form*, for example as severe inflation or a steadily increasing government deficit. Worse, by delaying a crisis, government policy is seen as making it *more dramatic* and thus more painful.

Additionally, since the 1960s neoclassical economists have played down the ability of Keynesian policies to manage an economy. Since the 1960s, economists like Nobel Laureates Milton Friedman and Edmund Phelps have made ground in their arguments that inflationary expectations negate the Phillips curve in the long run. The stagflation of the 1970s provided striking support for their theories, defying the simple Keynesian prediction that recessions and inflation cannot occur together. Friedman has gone so far as to argue that all the central bank of a country should do is to avoid making large mistakes, as he believes they did by contracting the money supply very rapidly in the face of the Wall Street Crash of 1929, in which they made what would have been a recession into the Great Depression.

3.3 SCHUMPETER AND BUSINESS CYCLES

Joseph Alois Schumpeter (8 February 1883 – 8 January 1950) was an economist and political scientist born in Moravia, then Austria-Hungary, now Czech Republic. He popularized the term "creative destruction" in economics

The leading economic theoretician to work on trade cycles in the first half of the twentieth century was undoubtedly Joseph Schumpeter. He was an Austrian, but cannot properly be regarded as a member of the Austrian School. He is not a liberal economist like von Hayek or von Mises. Joseph Schumpeter can properly be regarded as a man of the left, though certainly not of the far left. In 1927, Schumpeter published in *Economica* his paper on "The explanation of the business cycle". After the global shock of the banking crisis of 2008, which itself came more than eighty years after this paper was published, the world is again looking for explanations.

Schumpeter is important because he developed a theory of business cycles which puts its emphasis on industrial innovations rather than banking. Most business cycle theories put their emphasis the other way, and are essentially monetary. Maynard Keynes is just as much a monetary economist as Milton Friedman when he comes to his explanation of business cycles. This is surely an argument which is going to be reopened.

Schumpeter starts his account of business cycles at the top rather than the bottom of the cycle. "These booms consist in the carrying out of innovations in the industrial and commercial organisms. By innovations I understand such changes in the combinations of the factors of production as cannot be effected by infinitesimal steps or variations on the margin. They consist primarily in changes of methods of production and transportation, or in changes of industrial organisation, or in the production of a new article, or in the opening up of new markets or of new sources of material. The recurring periods of prosperity of the cyclical movements are the form progress takes in a capitalist society."

He goes on to argue from economic history – and this part of the Schumpeter argument would be difficult to question. "The reader needs only to make the experiment. If he comes to survey industrial history from, say, 1760 onwards, he will discover two things; he will find that very many booms are unmistakably characterised by revolutionary changes in some branch of industry which, in consequence, leads the boom,

railways, for instance in the forties, or steel in the eighties, or electricity in the nineties...”

His conclusion is stated very clearly: “booms and consequently depressions are not the work of banks: their cause is a non-monetary one and entrepreneurs demand is the initialing cause even of so much of the cycle as can be said to be added by the act of banks.”

In 2008, we have had a conspicuous example of a crash apparently caused by the banks. It looks like the “debt-deflation” type of crash. But we also have to account for oil, for Google, for China. These are the triggers which may be the underlying explanation of the behaviour of the banks. The relationship between business cycles and changes in business conditions may be mediated through bankers or speculators, but the big causes, as Schumpeter believed, may not lie in the banks themselves.

Schumpeter's relationships with the ideas of other economists were quite complex in his most important contributions to economic analysis - the theory of business cycles and development. Following neither Walras nor Keynes, Schumpeter starts in *The Theory of Economic Development* with a treatise of circular flow which, excluding any innovations and innovative activities, leads to a stationary state. The stationary state is, according to Schumpeter, described by Walrasian equilibrium. The hero of his story, though, is, in fine Austrian fashion, the entrepreneur.

The entrepreneur disturbs this equilibrium and is the prime cause of economic development, which proceeds in cyclic fashion along several time scales. In fashioning this theory connecting innovations, cycles, and development, Schumpeter kept alive the Russian Nikolai Kondratiev's ideas on 50-year cycles, Kondratiev waves.

Schumpeter suggested a model in which the four main cycles, Kondratiev (54 years), Kuznets (18 years), Juglar (9 years) and Kitchin (about 4 years) can be added together to form a composite waveform. (Actually there was considerable professional rivalry between Schumpeter and Kuznets. The wave form suggested here did not include the Kuznets Cycle simply because Schumpeter did not recognize it as a valid cycle. See "Business Cycle" for further information.) A Kondratiev wave could consist of three lower degree Kuznets waves. Each Kuznets wave could, itself, be made up of two Juglar waves. Similarly two (or three) Kitchin waves could form a higher degree Juglar wave. If

each of these were in phase, more importantly if the downward arc of each was simultaneous so that the nadir of each was coincident it would explain disastrous slumps and consequent depressions. (As far as the segmentation of the Kondratyev Wave, Schumpeter never proposed such a fixed model. He saw these cycles varying in time - although in a tight time frame by coincidence - and for each to serve a specific purpose)

Schumpeter and Keynesianism

Unlike Keynes, in Schumpeter's theory, Walrasian equilibrium is not adequate to capture the key mechanisms of economic development. Schumpeter also thought that the institution enabling the entrepreneur to purchase the resources needed to realize his or her vision was a well-developed capitalist financial system, including a whole range of institutions for granting credit. One could divide economists among (1) those who emphasized "real" analysis and regarded money as merely a "veil" and (2) those who thought monetary institutions are important and money could be a separate driving force. Both Schumpeter and Keynes were among the latter. Nevertheless, Schumpeter, who was a classical liberal, rejected Keynesianism

3.4 KALDOR'S NON-LINEAR CYCLE

One of the most interesting theories of business cycles in the Keynesian vein is that expounded in a pioneering article by Nicholas Kaldor (1940). It is distinguishable from most other contemporary treatments since it utilizes non-linear functions, which produce endogenous cycles, rather than the linear multiplier-accelerator kind which rely largely on exogenous factors to maintain regular cycles. We shall follow Kaldor's simple argument and then proceed to analyze Kaldor in the light of the rigorous treatment given to it by Chang and Smyth (1971) and Varian (1979).

What prompted Kaldor's innovation? Besides the influence of Keynes (1936) and Kalecki (1937), in his extremely readable article, Kaldor proposed that the treatment of savings and investment as linear curves simply does not correspond to empirical reality. In (Harrodian version of) Keynesian theory, investment and savings are both positive functions of output (income). The savings relationship is cemented by the income-expenditure theory of Keynes:

$$S = (1-c)Y$$

whereas investment is positively related to income via an accelerator-like relationship, (which, in Kaldor, is related to the *level* rather than the change in income):

$$I = vY$$

where v , the Harrod-Kaldor accelerator coefficient, is merely the capital-output ratio. Over these two relationships, Kaldor superimposed Keynes's multiplier theory: namely, that output changes to clear the goods market. Thus, if there is excess goods demand (which translates to saying that investment exceeds savings, $I > S$), then output rises ($dY/dt > 0$), whereas if there is excess goods supply (which translates to savings exceeding investment, $I < S$), then output falls.

The implications of linearity can be visualized in Figure 1, where we draw two positively-sloped *linear* I and S curves. To economize on space, we place two separate sets of curves in the same diagram. In the left part of Figure 1, the slope of the savings function is larger than that of the investment function. Where they intersect ($I = S$) is the equilibrium Y^* . As we can note, left of Y^* , investment is greater than savings ($I > S$), hence output will increase by the multiplier dynamic. Right of point Y^* , savings is greater than investment ($I < S$), hence output will fall. Thus, the equilibrium point Y^* is stable.

In the right side of Figure 1, we see linear S and I functions again, but this time, the slope of the investment curve is greater than that of the savings curve. Where they intersect, Y^* , investment equals savings ($I = S$) and we have equilibrium. However, note that left of the equilibrium Y^* , savings are greater than investment ($I < S$), thus output will contract and we will move away from Y^* . In contrast, right of Y^* , investment is greater than savings ($I > S$), so output will increase and move further to the right of Y^* . Thus, equilibrium Y^* is unstable.

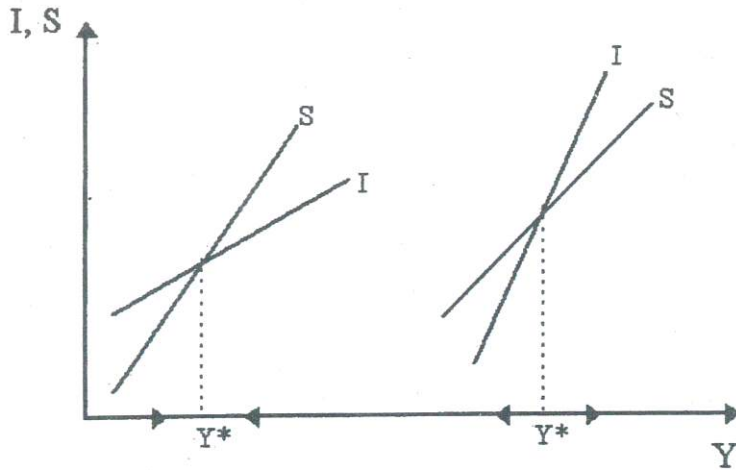


Fig. 1 - Savings, Investment and Output Adjustment

Both exclusive cases, complete stability and complete instability, are implied by linear I and S curves in figure 1, are incompatible with the empirical reality of cycles and fluctuations. Hence, Kaldor concluded, it might be sensible to assume that the S and I curves are non-linear. In general, he assumed $I = I(Y, K)$ and $S = S(Y, K)$, where investment and savings are non-linear functions of income and capital as in the Figure 2 below.

We shall focus the relationship with income first. The logic Kaldor (1940) gave for this is quite simple. The non-linear investment curve, shown in Figure 2 can be explained by simply recognizing that the rate of investment will be quite low at extreme output levels. Why? Well, at low output levels (e.g. at Y_A), there is so much excess capacity that any increase in aggregate demand will induce very little extra investment. The extra demand can be accommodated by existing capacity, so the rate of investment is low. In contrast, at high rates of output, such as Y_C , Wicksellian problems set in. In other words, with such high levels of output and demand, the cost of expanding capacity is also increasing, capital goods industries are supply-constrained and thus demand a higher price from entrepreneurs for producing an extra unit of capital. In addition, the best investment projects have probably all already been undertaken at this point, so that the only projects left are low-yielding and simply might not be worth the effort for the entrepreneur. Thus, the rate of investment will also be relatively low. At output levels

between Y_A and Y_C (e.g. at Y_B), the rate of investment is higher. Thus, the non-linearity of the I curve is reasonably justified.

What about the non-linear savings curve, S ? As shown in Figure 2, it is assumed by Kaldor that savings rates are high at extreme levels of output. At low levels of output (Y_A), income is so low that savings are the first to be cut by individuals in their household decisions. Therefore, at this point, the rate of saving (or rather, in this context, the rate of dissaving) is extremely high. Slight improvements in income, however, are not all consumed (perhaps by custom or precaution), but rather much of it is saved. In contrast, at high levels of output, Y_C , income is so high that the consumer is effectively saturated. Consequently, he will save a far greater portion of his income - thus, at points like Y_C , the savings rate is quite high.

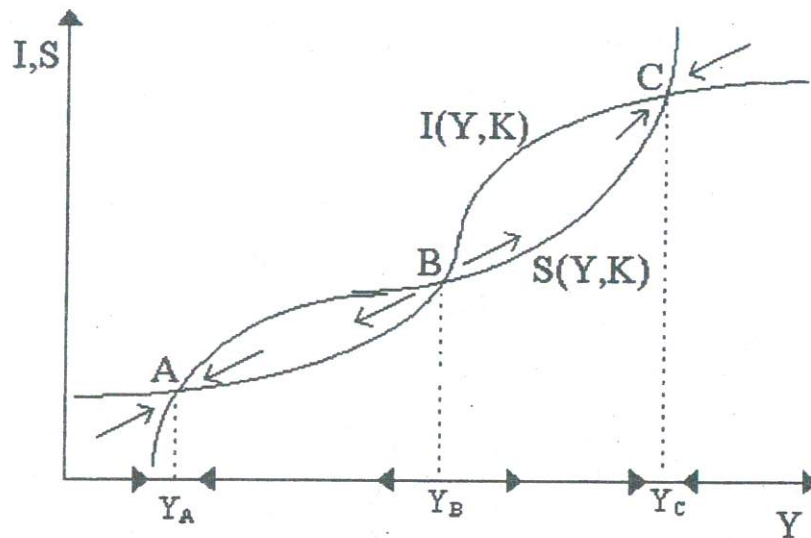


Fig. 2 - Non-Linear Investment and Savings

With the non-linearity of I and S justified, Kaldor (1940) proceeded to analyze cyclical behavior by superimposing the I and S curves (as in Figure 2). As we can see, there are three points of intersection (A , B and C) where savings equals investment ($I = S$). Let us consider each individually. Left of point A , investment is greater than savings hence, by the multiplier, Y increases to Y_A ; to the right of point A , savings is greater than investment (hence Y decreases to Y_A). Consequently, it is easy to note that A (and Y_A) is a stable point. The same analysis applies to the points to the right and left of Y_C , hence C (and Y_C) is also a stable point.

Intersection point B (at Y_B) in Figure 2 is the odd one. Left of B, savings exceeds investment (so Y falls left of Y_B) and right of B, investment exceeds savings (so Y increases right of Y_B). Thus, B is an unstable point. Consequently, then, we are faced with two stable equilibria (A and C) and an unstable equilibrium (B). How can this explain cyclical phenomenon? If we are at A, we stay at A. If we are at C, we stay at C. If we are at B, we will move either to A or C with a slight displacement. However, no cycles are apparent.

The clincher in Kaldor's system is the phenomenon of *capital accumulation* at a given point in time. After all, as Kaldor reminds us, investment and savings functions are short term. At a high stable level of output, such as that at point Y_C in the figure above, if investment is happening, the stock of capital is increasing. As capital stock increases, there are some substantial changes in the I and S curves. In the first instance, as capital stock increases, the return or marginal productivity of capital declines. Thus, it is not unreasonable to assume that investment will fall over time. Thus, it is acceptable that $dI/dK < 0$, i.e. the I curve falls.

However, as capital goods become more available, a greater proportion of production can be dedicated to the production of consumer goods. As consumer goods themselves increase in number, the prices of consumer goods decline. For the individual consumer, this phenomenon is significant since it implies that less income is required to purchase the same amount of goods as before. Consequently, there will be more income left over to be saved. Thus, it is also not unreasonable to suspect that the savings curve, S, will gradually move upwards, i.e. $dS/dK > 0$. This is illustrated in Figure 3.

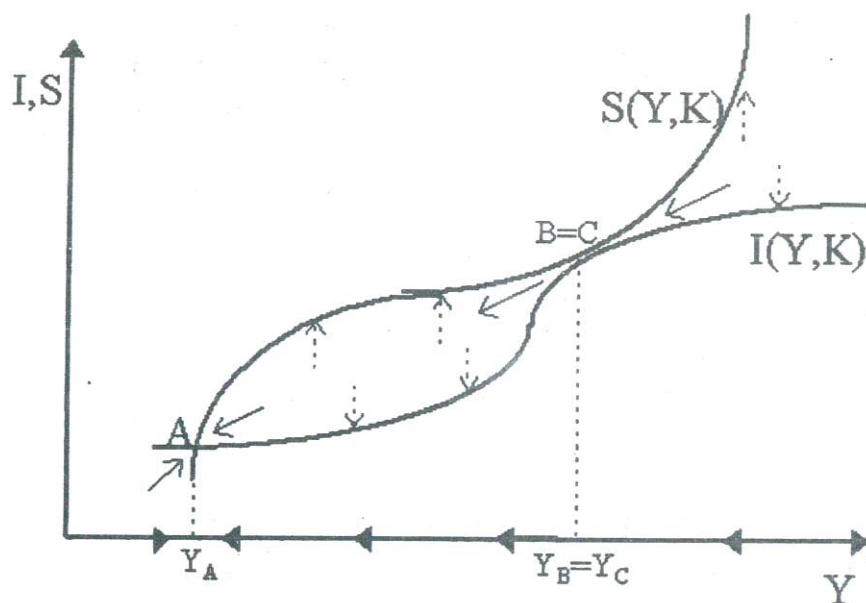


Fig. 3 - Capital Accumulation and Gravitation of Investment and Savings Curves

So, we can see the story by visualizing the move from Figure 2 to Figure 3. Starting from our (old) Y_C , as $I(Y, K)$ moves down and $S(Y, K)$ moves down, point B will gradually move from its original position in the middle towards C (i.e. Y_B will move right) while point C moves towards B (Y_C moves left). As shown in Figure 3, as time progresses, and the investment and savings curves continue on their migration induced by capital accumulation, and B and C approximate each other, we will reach a situation where B and C meet at $Y_B = Y_C$ and the S and I curves are tangential to each other. Notice that at this point in time, C is no longer stable - left and right of point C, savings exceeds investment, thus output must fall - and indeed will fall catastrophically from $Y_B = Y_C$ to the only stable point in the system: namely, point A at Y_A .

At Y_A , we are again at a stable, short-run equilibrium. However, as in the earlier case, the S and I curves are not going to remain unchanged. In fact, they will move in the opposite direction. As investment is reined back, there might not even be enough to cover replacement. Thus, previous investment projects which were running on existing capital will disappear with depreciation. The usefulness (i.e. productivity) of the projects, however, remains. Thus, the projects reemerge as "new" opportunities. In simplest terms, with capital decumulation, the return to capital increases and hence investment becomes more attractive, so that the I curve will shift upwards (see Figure 4). Similarly, as capital

is decumulated, consumer industries will disappear, prices rise and hence real income (purchasing power) per head declines so that, to keep a given level of real consumption, savings must decline. So, the S curve falls. Ultimately, as time progresses and the curves keep shifting, as shown in Figure 4, until we will reach another tangency between S and I analogous to the one before. Here, points B and A merge at $Y_A = Y_B$ and the system becomes unstable so that the only stable point left is C. Hence, there will be a catastrophic rise in production from Y_A to Y_C .

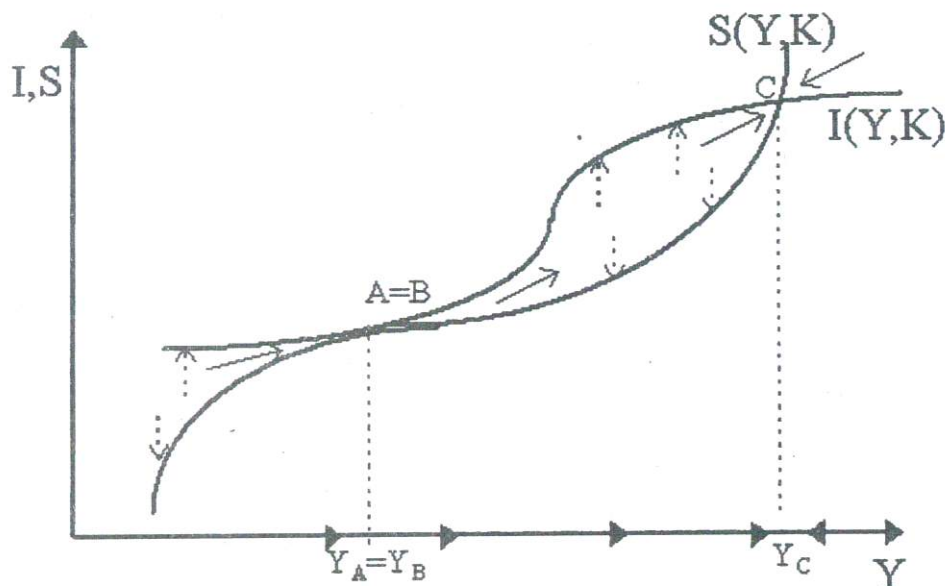


Fig. 4 - Capital Decumulation and Gravitation

Thus, we can begin to see some cyclical phenomenon in action. Y_A and Y_C are both short-term equilibrium levels of output. However, neither of them, in the long-term, is stable. Consequently, as time progresses, we will be alternating between output levels near the lower end (around Y_A) and output levels near the higher end (around Y_C). Moving from Y_A to Y_C and back to Y_A and so on is an inexorable phenomenon. In simplest terms, it is Kaldor's trade cycle.

W.W. Chang and D.J. Smyth (1971) and Hal Varian (1979) translated Kaldor's trade cycle model into more rigorous context: the former into a limit cycle and the latter into catastrophe theory. Output, as we saw via the theory of the multiplier, responds to the difference between savings and investment. Thus:

$$dY/dt = x (I - S)$$

where x is the "speed" by which output responds to excess investment. If $I > S$, $dY/dt > 0$. If $I < S$, $dY/dt < 0$. Now both savings and investment are positive (non-linear) functions of income and capital, hence $I = I(K, Y)$ and $S = S(K, Y)$ where $dI/dY = I_Y > 0$ and $dS/dY = S_Y > 0$ while $dI/dK = I_K < 0$ and $dS/dK = S_K > 0$, for the reasons explained before. At any of the three intersection points, Y_A , Y_B and Y_C , savings are equal to investment ($I - S = 0$).

We are faced basically with two differential equations:

$$dY/dt = x [I(K, Y) - S(K, Y)]$$

$$dK/dt = I(K, Y)$$

To examine the local dynamics, let us linearize these equations around an equilibrium (Y^*, K^*) and restate them in a matrix system:

$$dY/dt \quad x (I_Y - S_Y) \quad x (I_K - S_K) \quad Y$$

$$dK/dt \quad I_Y \quad I_K \quad [Y^*, K^*] K$$

the Jacobian matrix of first derivatives evaluated locally at equilibrium (Y^*, K^*) , call it A , has determinant:

$$\begin{aligned} |A| &= x (I_Y - S_Y)I_K - x (I_K - S_K)I_Y \\ &= x (S_K I_Y - I_K S_Y) \end{aligned}$$

where, since $I_K < 0$ and $S_K, S_Y, I_Y > 0$ then $|A| > 0$, thus we have regular (non-saddlepoint) dynamics. To examine local stability, the trace is simply:

$$\text{tr } A = x (I_Y - S_Y) + I_K$$

whose sign, obviously, will depend upon the sign of $(I_Y - S_Y)$. Now, examine the earlier Figures 3 and 4 again. Notice around the extreme areas, i.e. around Y_A and Y_C , the slope of the savings function is greater than the slope of the investment function, i.e. $dS/dY > dI/dY$ or, in other words, $I_Y - S_Y < 0$. In contrast, around the middle areas (around Y_B) the slope of the savings function is less than the slope of the investment function, thus $I_Y - S_Y > 0$. Thus, assuming I_K is sufficiently small, the trace of the matrix will be *positive* around the middle area (around Y_B), thus equilibrium B is locally unstable, whereas around the extremes (Y_A and Y_C), the trace will be negative, thus equilibrium A and C are locally stable. This is as we expected from the earlier diagrams.

To obtain the phase diagram in Figure 5, we must obtain the isoclines $dY/dt = 0$ and $dK/dt = 0$ by evaluating each differential equation at steady state. When $dY/dt = 0$, note that $x [I(Y, K) - S(Y, K)] = 0$, then using the implicit function theorem:

$$dK/dY|_{dY/dt=0} = -(I_Y - S_Y)/(I_K - S_K)$$

Now, we know from before that $I_K < 0$ and $S_K > 0$, thus the denominator $(I_K - S_K) < 0$ for certain. The shape of the isocline for $dY/dt = 0$, thus, depends upon the value of $(I_Y - S_Y)$. As we claimed earlier, for extreme values of Y (around Y_A and Y_C), we had $(I_Y - S_Y) < 0$, thus $dK/dY|_Y < 0$, i.e. the isocline is negatively shaped. However, around middle values of Y (around Y_B), we had $(I_Y - S_Y) > 0$, thus $dK/dY|_Y > 0$, i.e. the isocline is positively shaped. This is shown in Figure 5.

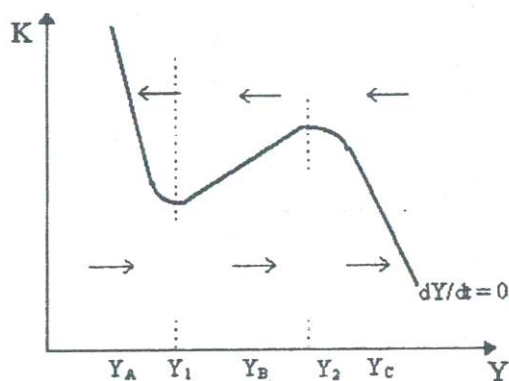


Fig. 5 - Isokine for $dY/dt = 0$

From Figure 5, we see that at low values of Y (below Y_1) and high values of Y (above Y_2), the isokine is negatively-sloped - this corresponds to the areas in our earlier diagrams where the savings function was steeper than the investment function (e.g. around Y_A and Y_C). However, between Y_1 and Y_2 , the isokine is positively-sloped - which corresponds to the areas where investment is steeper than savings (around Y_B in our earlier diagrams). The off-isokine dynamics are easy, namely differentiating the differential equation dY/dt for K :

$$d(dY/dt)/dK = x [I_K - S_K] < 0$$

as $I_K < 0$ and $S_K > 0$. Thus, above the isokine, $dY/dt < 0$, so output falls whereas below the isokine, $dY/dt > 0$, so output rises. The directional arrows indicate these tendencies.

We can already get a flavor of Kaldor's trade cycle from Figure 6. Remember that our earlier Kaldorian diagrams were drawn for a particular level of capital, K . Thus, as we see in Figure 6, for a given level of K_0 , we can find the corresponding equilibria (Y_A , Y_B , Y_C) at the intersection between the isokine and the level line K_0 . However, suppose we start at point C so that K begins to rise: notice that when K_0 rises to K_2 , the points Y_C and Y_B begin to move together and finally "merge" at the critical point D (which corresponds to our old $B=C$) at point Y_2 . The underlying dynamic (represented by the phase arrows) implies that point D is completely unstable so there will be a catastrophic jump from D to the lower equilibrium E (which is where A moved to as K rose from K_0 to K_2). Notice that during this catastrophic fall in output is driven solely by the fast multiplier dynamic - the slower-moving capital dynamic is inoperative as, in moving from D to E, capital is constant at K_2 .

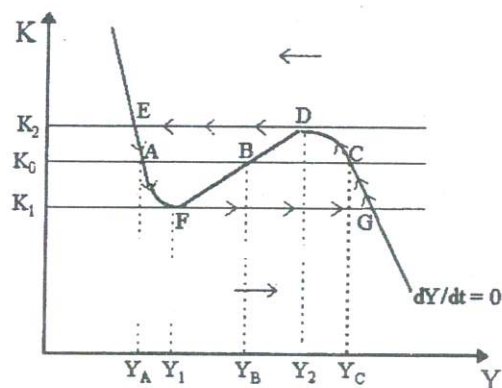


Figure 6 - Dynamics of the Kaldor Cycle

The rest of the story then follows in reverse. At E in Figure 6, we are at a pretty low output level and thus capital decumulates and so K declines from K_2 past K_0 and then on towards K_1 . In the meantime, our lower two equilibrium begin to move towards each other and A and B meet and merge at point F at Y_1 (equivalent to our old $A=B$). Note that the stability arrows in Figure 6 are such that now we must have a catastrophic jump in output from F to point G (the high equilibrium to which point C moved to as capital fell from K_2 to K_1). From G, the process then begins again as capital rises at high output levels from K_1 to K_0 and onto K_2 .

The output cycle that can be traced out from the arrows drawn in Figure 6 (from slow movement from G to C to D then catastrophic jump to E then slow movement from

E to A to F then catastrophic jump to G, etc.) is Kaldor's trade cycle: output thus fluctuates over time between the boundaries imposed by the extreme points E (lower bound) and G (upper bound). Notice that the cycle is *completely* endogenous: no exogenous shocks, ceilings, floors, structurally unstable parameter values or ratchets are necessary to obtain constant cycles. The non-linearity of the curves, which are economically-justified and not exceptional, is more than sufficient to generate endogenous cycles.

This version of Kaldor's model is derived a bit more formally in Varian (1979) using catastrophe theory. However, we can also use regular non-linear dynamical theory, which makes no assumptions about the relative speeds of the dynamics, to obtain a cycle from the Kaldor model - and this is what Chang and Smyth (1971) do. We have already derived the isokine $dY/dt = 0$, so to get the full story, we need the $dK/dt = 0$ isokine. This is simple. $dK/dt = I(Y, K)$, thus at steady-state, $dK/dt = 0 = I(Y, K)$ so the isokine has slope:

$$dK/dY|_K = -I_Y/I_K > 0$$

as $I_Y < 0$ and $I_K > 0$. Thus, the $dK/dt = 0$ isokine is positive sloped. We have superimposed it on the other isokine in Figure 7. For the off-isokine dynamics, note that:

$$d(dK/dt)/dY = I_Y > 0$$

so that the directional arrows drawn in for the $dK/dt = 0$ isokine imply that to the left of it, $dK/dt < 0$ (capital falls) whereas to the right, $dK/dt > 0$ (capital rises). In the figure below, we have superimposed the isokines for the whole system. As is obvious, the global equilibrium, where $dK/dt = dY/dt = 0$, is at K^* and Y^* (point E). Now, as we showed earlier, the trace of the system, $\text{tr } A$, is positive around point E, thus we know that the global equilibrium is locally unstable - as is shown in Figure 7 by the unstable trajectory that emerges when we move slightly off the equilibrium point E..

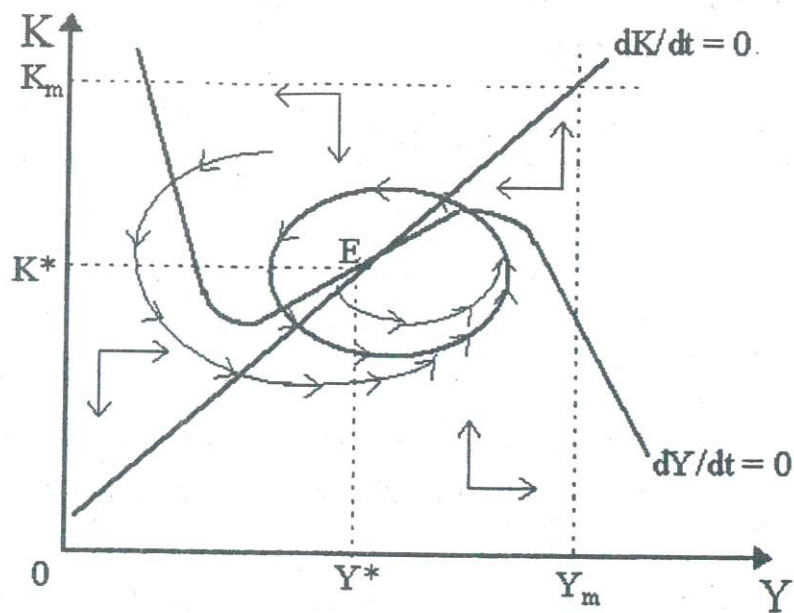


Fig. 7 - Kaldor's Trade Cycle

However, notice that the system as a whole is "stable": when we draw a "box" around the diagram by imposing upper boundaries K_m and Y_m in Figure 7 and letting the axis act as lower boundaries, then the directional phase arrows around the boundaries of the box indicate that we do *not* get out of the confines of this box - any trajectory which enters the "box" will not leave it. Indeed, from the distant boundaries, it almost seems as if we are moving *towards* the global equilibrium (K^*, Y^*) . Thus, while the equilibrium (K^*, Y^*) is locally unstable, we are still confined within this "box". Note that we are assuming complex roots to obtain stable and unstable focal dynamics as opposed to simply monotonic ones.

In fact, these three conditions - complex roots, locally unstable equilibrium and a "confining box" - are all that is necessary to fulfill the Poincar-Bendixson Theorem on the existence of a dynamic "limit cycle". This limit cycle is shown by the thick black circle in Figure 7 (not perfectly drawn) orbiting around the equilibrium. Any trajectory that begins *within* the circle created by the limit cycle will be explosive and move *out* towards the cycle. In contrast, any trajectory that begins *outside* the circle will be dampened and move *in* towards it. Two such trajectories are shown in Figure 7. Thus, the limit cycle "attracts" all dynamic trajectories to itself and once trajectory confluences

with the limit cycle; it proceeds to follow the orbit of the limit cycle forever (as shown by the directional arrows on the cycle).

3.5 SAMUELSON AND HICKS MODEL

In the Samuelson–Hicks business cycle model, investment is determined by the growth in income, through the principle of acceleration. More precisely, investment is taken to be proportional to the rate of change in income, or $I_t = k(Y_{t-1} - Y_{t-2})$, where I_t denotes investment in time period t , Y_{t-1} and Y_{t-2} income one and two periods back, respectively, and the parameter $k (>0)$ is the accelerator (this parameter is the technical coefficient for capital, it is the volume of capital needed to produce one unit of goods during one time period). In past empirical measurement a realistic estimate was considered to be about 2–4. Obviously, this numerical value depends on the choice of the length of the basic time period for the model.

It is important in this context to realize that economics distinguishes between concepts of stocks and flows. Stocks are variables which are meaningful by reference to a point of time, such as a stock of capital or the labour force. Flows, on the other hand, are concepts referring to time periods, defined by a beginning and a finishing point on the time scale.

To the flows belong investments, consumption, and income/production. A produced quantity, given inputs in form of capital and labour stocks, obviously depends on the length of the time period. During half the period chosen, output is half, during double the period it double that for a period. In some economic models the period length may be a bit ambiguous. This is, however, not the case in macro economic models, which arose in connection with Keynesian theory and national accounting in the 1930's. The reference period is always one year, and whenever accounts or forecasts are made for shorter periods, they are always evaluated to a yearly basis.

Hence, the time period in macro economic models such as the present is always the calendar year. As for the consumption function, a Robertsonian formulation is assumed, $C_t = bY_{t-1}$ where $0 < b < 1$ is the marginal propensity to consume (realistic values belongs to the range (0.6, 1)). Any additional constant term is absorbed in the autonomous expenditure term to be introduced below. This is composed of all the

expenditures not dependent on the business cycle, i.e. government expenditures, non-induced investments, due to for instance innovations, and any non-income dependent consumption expenditures.

It is common knowledge that consumers need to consume something to survive even if they earn nothing. When population/labour force grows, then the autonomous expenditures for this minimum subsistence consumption must grow along with the labour force. The Keynesian income formation identity $Y_t = C_t + I_t$, allows us to obtain a simple recurrence relation in the income variable: $Y_t = (b+k)Y_{t-1} - kY_{t-2}$. This has a closed form solution and models the business cycles mechanism. The solution is the product of an exponential growth, or decline factor, and, in case of complex roots to the characteristic equation, a harmonically varying cyclic function.

The cyclical element provides a possibility for explaining recurrent cycles, but the exponential factor poses a problem. As it is an unlikely coincidence for the exponential factor to become a constant, the cycles are either exponentially increasing or decreasing in amplitude. If they are decreasing, there is no dynamic theory at all, because the theory only explains how the system goes to eternal equilibrium suggests that external shocks have to be introduced to keep an oscillating system going, even when it is damped. The dynamical system itself would then provide for a periodicity.

Hicks choose another possibility: to introduce bounds for the linear accelerator. At the same time tries to model a growth process within the Keynesian tradition. As it is well known, the Harrodian equilibrium growth path is unstable, and so is the business cycles mechanism in the empirically relevant parameters space of the multiplier-accelerator mechanism. Hicks therefore develop a Harrodian multiplier-accelerator framework with ceilings and floors, thereby constraining the instability problems and producing cyclical behaviour (technically he moves from a linear to a piecewise-linear system). According to Hicks, when income decreases with fixed proportions technology, more capital could be dispensed with than normally what disappears during one period through natural wear. As the capitalists are assumed not actively to destroy capital, just abstain from reinvesting, there is a lower bound to disinvestments, the floor (i.e. net investment cannot be negative).

Likewise, if income is rising, other factors of production, labour force or raw materials, become limiting, then there would be no point in pushing investment any further, so there is also a ceiling to investments (full employment, e.g.). Accordingly, a lower and an upper bound to investment limit the action of the linear acceleration principle. This in fact makes the investment function piecewise-linear, i.e. nonlinear. The result could be self-sustained oscillations of limited amplitude. In his book, Hicks introduces autonomous expenditures which are not constant, but may be growing exponentially, i.e. $A_t = A_0(1+g)^t$, where g is a given growth rate and A_0 a positive constant. Summarizing we have:

$$Y_t = C_t + I_t$$

$$C_t = bY_{t-1}$$

$$I_t = I'_t + I''_t = k(Y_{t-1} - Y_{t-2}) + A_0(1+g)^t$$

so that

$$Y_t = bY_{t-1} + k(Y_{t-1} - Y_{t-2}) + A_0(1+g)^t$$

So, the Schumpeter and Hicks model predicted that an increase in government spending would cause GDP to expand. However, when the government needs more money, it drives up interest rates. This is bad for the private sector, which can have its investments *crowded out*. The level of decrease in private investment was unclear. Maybe Samuelson and other policy makers thought that government spending should fill in when private investment fell short in order to straighten total investment, which in turn determines GDP. That way, they might have hoped, business cycles might go away

3.6 IMPLICATION OF POLICIES AND CONTROL OF BUSINESS CYCLES

Market economies have regular fluctuations in the level of economic activity which we call the business cycle. It is convenient to think of the business cycle as having three phases. The first phase is expansion when the economy is growing along its long term trends in employment, output, and income. But at some point the economy will overheat, and suffer rising prices and interest rates, until it reaches a turning point -- a *peak* -- and turn downward into a recession (the second phase). Recessions are usually brief (six to nine months) and are marked by falling employment, output, income, prices.

and interest rates. Most significantly, recessions are marked by rising unemployment. The economy will hit a bottom point -- a *trough* -- and rebound into a strong recovery (the third phase). The recovery will enjoy rising employment, output, and income while unemployment will fall. The recovery will gradually slow down as the economy once again assumes its long term growth trends, and the recovery will transform into an expansion.

3.6.1 Economic policy and the business cycle

The approach to the business cycle depends upon the type of economic system. Under a *communist* system, there is no business cycle since all economic activities are controlled by the central planners. Indeed, this lack of a business cycle is often cited as an advantage of a command economy. Both *socialist* and *fascist* economies have a mix of market and command sectors. Again, the command sector in these economies will not have a business cycle -- while the market sector will display a cyclical activity. In a full *market* economy -- like the United States -- the nation can suffer extreme swings in the level of economic activity.

The economic policies used by the government to smooth out the extreme swings of the business cycle are called contracyclical or stabilization policies, and are based on the theories of John Maynard Keynes. Writing in 1936 (the Great Depression), Keynes argued that the business cycle was due to extreme swings in the total demand for goods and services. The total demand in an economy from households, business, and government is called *aggregate demand*. Contracyclical policy is increasing aggregate demand in recessions and decreasing aggregate demand in overheated expansions.

In a market economy (or market sector) the government has two types of economic policies to control aggregate demand -- fiscal policy and monetary policy. When these policies are used to stimulate the economy during a recession, it is said that the government is pursuing *expansionary* economic policies. And when they are used to contract the economy during an overheated expansion, it is said that the government is pursuing *contractionary* economic policies.

3.6.2 Other policies

1) Discretionary Fiscal Policy. Fiscal policy is *changes* in the taxing and spending of the federal government for purposes of expanding or contracting the level of aggregate demand. In recession, an expansionary fiscal policy involves lowering taxes and increasing government spending. In an overheated expansion, a contractionary fiscal policy requires higher taxes and reduced spending.

The first way this can be done is through the federal budget process. However, this process takes so long -- 12 to 18 months -- that discretionary fiscal policy cannot be matched with the business cycle. The Kennedy tax cut of 1964 and later the Ford tax increase of 1974 hit the economy just when the opposite contra cyclical policy was needed. As a result, the federal government no longer uses discretionary fiscal policy.

2) Automatic Stabilizers. A second type of fiscal policy is built into the *structure* of federal taxes and spending. This is referred to as "nondiscretionary fiscal policy" or more commonly as "automatic stabilizers". The progressive income tax (the major source of federal revenue) and the welfare system both act to increase aggregate demand in recessions and to decrease aggregate demand in overheated expansions.

3) Monetary Policy. Monetary policy is under the control of the Federal Reserve System (our central bank) and is completely discretionary. It is the *changes* in interest rates and money supply to expand or contract aggregate demand. In a recession, the Fed will lower interest rates and increase the money supply. In an overheated expansion, the Fed will raise interest rates and decrease the money supply.

These decisions are made by the Federal Open Market Committee (FOMC) which meets every six to seven weeks. The policy changes can be done immediately, although the impact on aggregate demand can take several months. Monetary policy has become the major form of discretionary contra cyclical policy used by the federal government. A source of conflict is that the Fed is independent and is not under the direct control of either the President or the Congress. This independence of monetary policy is considered to be an important advantage compared to fiscal policy. Now let us have a close look into both fiscal and monetary policies.

3.6.3 Monetary policy

Control over the money supply and interest rates by a central bank or monetary authority to stabilize business cycles, reduce unemployment and inflation, and promote economic growth. In the United States monetary policy is undertaken by the Federal Reserve System (the Fed). In principle, Federal Reserve policy makers can use three different tools--open market operations, the discount rate, and reserve requirements--to manipulate the money supply. In practice, however, the primary tool employed is open market operations. An alternative to monetary policy is fiscal policy.

Monetary policy is controlling of the quantity of money in circulation for the expressed purpose of stabilizing the business cycle and reducing the problems of unemployment and inflation. In days gone by, monetary policy was undertaken by printing more or less paper currency. In modern economies, monetary policy is undertaken by controlling the money creation process performed through fractional-reserve banking.

The Federal Reserve System (or the Fed) is U.S. monetary authority responsible for monetary policy. In theory, it can control the fractional-banking money creation process and the money supply through open market operations, the discount rate, and reserve requirements. In practice, the Fed primarily uses open market operations, the buying and selling of U.S. Treasury securities, for this control.

An important side effect of money supply control is control of interest rates. As the quantity of money changes, banks are willing to make loans at higher or lower interest rates.

Monetary policy comes in two basic varieties--expansionary and contractionary:

- Expansionary monetary policy or easy money results if the Fed increases the money supply and lowers interest rates and is the recommended policy to counter a recession.
- Contractionary monetary policy or tight money occurs if the Fed decreases the money supply and raises interest rates and is the recommended policy to reduce inflation.

Three Goals

The general goal of monetary policy is to keep the economy healthy and prosperous. More specifically, monetary policy seeks to achieve the macroeconomic goals of full employment, stability, and economic growth. That is, monetary policy is used to stabilize the business cycle and in so doing reduce unemployment and inflation, and the while promoting an environment that is conducive to an expanding economy.

A word about these three macroeconomic goals and associated problems is in order.

- **Full Employment:** This results when all available resources (especially labor) willing and able to engage in production are producing goods and services. Falling short of this goal results in unemployment. Because some degree of unemployment naturally exists in a modern complex economy, full employment is achieved if the unemployment rate is about 5 percent. Unemployment means the economy forgoes the production goods and services.
- **Stability:** This exists when fluctuations in prices, production, and employment have been eliminated. While stability for all aspects of the economy are important, monetary policy tends to be most concerned with price stability, that is, keeping the price level in check and eliminating inflation. Inflation erodes the purchasing power of financial wealth.
- **Economic Growth:** This occurs when the production capacity of the economy increases over time, which is achieved by increasing the quantity and/or quality of resources. When the economy grows and production capacity expands, then more goods and services are available to satisfy wants and needs. Without economic growth, the economy stagnates, and often even experiences a falling living standard.

Three Tools

The Federal Reserve System has three tools that, in principle, can be used to control the money supply and interest rates.

- **Open Market Operations:** The Fed buys and sells U.S. Treasury securities. Such buying and selling affects the amount of excess reserves that banks have available to make loans and to create money. This is the primary monetary policy tool used by the Fed. If the Fed buys Treasury securities, banks have more reserves which

they use to make more loans at lower interest rates and increase the money supply. If the Fed sells Treasury securities, banks have fewer reserves which they use to make fewer loans at higher interest rates and decrease the money supply.

- **Discount Rate:** The Fed can also adjust the interest rate that it charges banks for borrowing reserves. Higher or lower rates affect the amount of excess reserves that banks have available to make loans and create money. If the Fed lowers the discount rate, then banks can borrow more reserves, which they can use to make more loans at lower interest rates, which then increases the money supply. If the Fed raises the discount rate, then banks can borrow fewer reserves, which they use to make fewer loans at higher interest rates, which then decreases the money supply. Changes in the discount rate are most often used as a signal for monetary policy actions.
- **Reserve Requirements:** The Fed can further adjust the proportion of reserves that banks must keep to back outstanding deposits (the reserve ratio). Higher and lower rates affect the deposit multiplier and the amount of deposits banks can create with a given amount of reserves. If the Fed lowers reserve requirements, then banks can use existing reserves to make more loans and thus increase the money supply. If the Fed raises reserve requirements, then banks can use existing reserves to fewer more loans and thus decrease the money supply. This tool is seldom used as a means of controlling the money supply.

The Federal Reserve System has another monetary policy tool, termed moral suasion that can be exceptionally effective--in limited circumstances. Moral suasion is a policy tool in which the Fed, usually the Chairman of the Board of Governors, requests that the banking system take some specific action, such as making more loans or fewer loans. Such requests are usually contrary to what banks are currently doing and are not mandated in any legal or regulatory sense.

The Tool of Choice: Open Market Operations

While all three tools affect the money creation process undertaken by banks and thus, in theory, can be used to change the quantity of money in circulation, open market operations is the tool of choice.

Open market markets are very precise and can be easily implemented. The Fed can buy or sell just the right amount of Treasury securities to achieve the amount of bank reserves that will generate the desired quantity of money and interest rate. Any buying or selling can be implemented within hours.

The discount rate works only if commercial banks actually borrow reserves from the Fed. Such borrowing is often dependent on factors other than the discount rate, such as the health of the banking system. A low discount rate does not guarantee banks will borrow more and a high discount rate does not guarantee banks will borrow less.

Reserve requirements are a fundamental part of the structure of the commercial banking system. They determine the division of bank assets between reserves and loans. Because the reallocation of assets between reserves and loans is not easily achieved, frequent changes in reserves requirements that would be needed to control the money supply will likely be ignored by banks as they opt for the highest likely reserve requirements.

Channels

In general, monetary policy induces changes in aggregate expenditures, especially investment but also consumption, which then results in changes in aggregate production (gross domestic product), the price level, and employment. However, the actual transmission mechanism runs through a variety of routes, termed the channels of monetary policy.

- **Interest Rate:** The most noted monetary policy channel works through interest rates. Monetary policy, particularly open market operations, trigger changes in interest rates which affects the cost of borrowing by both the household and business sectors and subsequently investment expenditures and consumption expenditures. The result is changes in aggregate production and other macroeconomic variables.
- **Exchange Rate:** A monetary policy channel that has become increasingly important with the integration of the global economy works through exchange rates. Monetary policy induced changes in interest rates also affect the flow of financial capital between countries, which then affects currency exchange rates. Currency exchange rates consequently impact the relative prices of imports into

and exports out of a country. The resulting change in net exports then changes aggregate production and other macroeconomic variables.

- **Wealth:** One of two related monetary policy channels works through the value of financial assets. By changing the financial wealth of the economy, monetary policy induces an adjustment in the portfolio of consumer assets. In particular, consumers are induced to modify the relative mix of financial and physical wealth, which is accomplished through consumption expenditures and which then affects aggregate production and other macroeconomic variables.
- **Equities:** The second of two related monetary channels working through value of financial assets relates specifically to the value of corporate stock (that is, equities). As the value or price of equities change relative to the resource cost of producing capital goods, the financial return on investment by the business sector also changes, which induces changes in investment expenditures and subsequent changes in aggregate production and other macroeconomic variables.
- **Bank Lending:** One of two related channels based on credit works through the willingness of banks to make loans to the business sector. As monetary policy changes the amount of available bank reserves, banks are more or less willing to make loans for business investment expenditures, which like the other channels also affect aggregate production and other macroeconomic variables.
- **Balance Sheet:** The second of two related monetary policy channels based on credit works through the balance sheets of business sector firms. As monetary policy affects the value of financial assets, the relative values of assets and liabilities change. As net worth changes, business sector firms are more or less able to borrow funds that are used for investment expenditures, from banks and other sources. This results in a change in investment expenditures and subsequently changes in aggregate production and other macroeconomic variables.

These six channels of monetary policy are neither independent nor mutually exclusive, nor are they equally important. Some channels tend to generate a bigger impact on the macroeconomy. And that impact changes over time under different circumstances. However, they inevitably work together. Monetary policy causes changes

in interest rates, exchange rates, and the value of financial assets. which affect consumption expenditures, investment expenditures, and net exports, all of which then cause changes in the aggregate production and the macroeconomy.

Targets

While the general goal of monetary policy is to promote a stable, healthy, prosperous economy, the effectiveness of monetary policy is evaluated based on one or more specific targets--measurable aspects of the macroeconomy.

The common targets are:

- **Interest Rates:** The most noted interest rate target is the interbank lending rate, commonly termed the Federal funds rate. This is the interest rate that banks change each other for short term reserve loans.
- **Monetary Aggregates:** Another important set of targets are the monetary aggregates, commonly termed M1, M2, and M3. M1 is the money supply. the financial assets used for actual payments, including currency and checkable deposits. M2 is a broader measure of the money supply and includes highly liquid near monies (savings deposits) in addition to currency and checkable deposits. M3 is a broader measure that includes M2 plus slightly less liquid assets.
- **Exchange Rates:** These are the prices one nation's currency in terms of the currencies of other nations.

Modern monetary policy generally works with a mix of targets, keeping an eye on interest rates, monetary aggregates, and exchange rates. However, in years past it was common practice to pursue one target to the exclusive of others. That is, for example, to implement whatever monetary policy was needed to effectively fix the Federal funds rate at a constant value, even though doing so might cause a great deal of volatility for the monetary aggregates and exchange rates.

Some modern nations, especially smaller countries, target exchanges rates. That is, they implement monetary policy that ensures the exchange rate between their domestic currency and that of another country, usually a larger country like United States, is essentially fixed. This provides a direct link between the two countries, meaning any monetary policy by the larger country also affects the smaller one.

The Monetary Authority

Monetary policy is undertaken by the monetary authority of a country, usually the central bank. In the United States, the Federal Reserve System is the monetary authority charged with controlling the money supply and implementing monetary policy.

The Board of Governors of the Federal Reserve System is generally in charge of monetary policy, but specific control rests with different parts of the Fed. The Board of Governors has complete control only over the reserve requirements. The Federal Open Market Committee (which includes the Board of Governors plus the Presidents of 5 Federal Reserve District Banks) is responsible for open market operations and thus has the primary control of monetary policy. The discount rate is under the direct authority of the 12 Federal Reserve District Banks, subject to approval by the Board of Governors.

Discretionary Control, or Not?

Most monetary policy undertaken by the Fed is termed discretionary policy. That is, the Fed sees or anticipates a problem with the macroeconomy, then takes explicit corrective actions. That is, the Fed makes a point to buy more Treasury securities or to raise the discount rate to achieve a particular goal.

The alternative to discretionary policy is nondiscretionary policy, that is, monetary policy that occurs automatically, usually according to a set of rules, that does not involve any explicit decisions or actions by the Fed.

The most noted nondiscretionary monetary policy is money supply rule. Such a rule would fix the growth of the money supply from year to year at a specific rate based on the long run growth of aggregate production. This provides a just enough extra money to purchase any additional production. In theory, this avoids the problems of inflation (too much money for available production) or unemployment (too little money for available production).

This might be an effective policy if money is the only factor creating an inflation and unemployment. Critics of a constant money supply growth rule contend that the demand for production can exceed or fall short of available production for reasons other than the money supply. If this occurs, then the monetary authority needs the ability to make compensating adjustments through discretionary monetary policy.

Politics: Two Views

Politics are never far from economics, especially when policies are involved. Such is the case for monetary policy of the Federal Reserve System. In some cases the Fed leans philosophically toward expansionary monetary policy (easy money) and in other cases toward contractionary monetary policy (tight money). The inclination for tight or easy money often results from political philosophy--conservative and liberal.

- Conservatives tend to favor individual choices over government, producers over consumers, and lower inflation over lower unemployment. Conservatives tend to prefer tighter, contractionary controls on the money supply. This keeps inflation rates down, even though higher unemployment rates might result.
- Liberals tend to favor government restrictions on individual choices, consumers over producers, and lower unemployment over lower inflation. Liberals tend to prefer looser, expansionary use of the money supply. This ensures lower unemployment rates, even though higher inflation rates might result.

The Federal Reserve System, especially the Chairman of the Board of Governors, tends to lean more in one political direction or the other. Some Fed Chairmen have tended to be more liberal, using monetary policy to keep unemployment rates low. Other Fed Chairmen have tended to be more conservative, using monetary policy to keep inflation rates low. While Fed Chairmen, in theory, can be absolutely, positively, completely neutral when it comes to politics, such almost never happens.

3.6.4 Fiscal policy

Control over government spending and taxes by a central government which is used to stabilize business cycles, reduce unemployment and inflation, and promote economic growth. In the United States fiscal policy is primarily undertaken at the federal level through acts of Congress and actions by the President. However, state and local governments also undertake fiscal policy to stabilize their local macroeconomics. The government sector has three alternative tools in the use of fiscal policy--government purchases, taxes, and transfer payments. An alternative to fiscal policy is monetary policy.

Fiscal policy is based on the presumption that aggregate expenditures, especially business investment, are the primary source of business-cycle instability. The means of

correcting this instability is thus also accomplished through aggregate expenditures. The goal of fiscal policy is to manipulate aggregate expenditures, and thus the macroeconomy, either directly through government purchases or indirectly through taxes and transfer payments.

A Bit of History

The government sector has played a central role the economy as long as governments and economies have existed. However, the active use of fiscal policy to stabilize business cycles and control macroeconomic is a relatively recent government function.

- The potential for the use of fiscal policy emerged during the Great Depression of the 1930s. As this decade of stagnation unfolded, attention was focused on the demand side of the economy, both as the cause the problems and the potential solution.
- This attention gained an enormous boost with publication of The General Theory of Employment, Interest and Money by John Maynard Keynes in 1936. This book launched Keynesian economics and the modern study of macroeconomics. Keynesian economics theoretically emphasized the importance of aggregate expenditures to business-cycle instability, especially the devastation of the Great Depression, and then pointed to the use of fiscal policy as the appropriate correction.
- Keynesian economics dominated the study of macroeconomics and government policies for the ensuing four decades. During this period, fiscal policy became increasingly important. It was the principal stabilization policy tool used in the 1960s and early 1970s. A noted fiscal policy tax cut was implemented under the Kennedy/Johnson Administrations to stimulate the economy, and stimulation is what occurred. A fiscal policy tax increase was enacted during the Nixon Administration during the 1970s to combat inflation, with lesser success.
- Even though Keynesian economics fell out of favor in the 1980s with monetary policy (the use of the money supply to control business cycles) becoming the stabilization policy of choice, fiscal policy continued to play a key role in the economy -- either by design or by default. By default, the Reagan Administration

during the 1980s, cut taxes and increased spending, the fiscal policy recipe for an expanding economy. which subsequently occurred? By design, the second Bush Administration during the early 2000s cut taxes for the purported goal of stimulating the economy, another act of fiscal policy, also with lesser success.

Policy Tools

In general, fiscal policy works through the two sides of the government's fiscal budget -- spending and taxes. However, it's often useful to separate these two sides into three specific tools -- government purchases, taxes, and transfer payments.

- **Government Purchases:** These are the expenditures by the government sector, especially the federal government, on final goods and services. They are the portion of gross domestic product purchased by the government sector. Any change in government purchases, as such, directly affects aggregate expenditures and thus the macroeconomy.
- **Taxes:** These are involuntary payments from the household sector to the government sector. Taxes are the primary source of revenue used by government to finance government spending. Taxes affect the amount of disposable income available for consumption and saving. As such, any change in taxes indirectly affects aggregate expenditures and the macroeconomy through consumption expenditures and investment expenditures (via saving).
- **Transfer Payments:** These are gifts made to the household sector. Unlike government purchases, these payments are not made in exchange for goods and services. Because these are financed with taxes, transfer payments are, in effect, the transfer of income from one person to another. Because transfer payments also affect the amount of disposable income available, any change in transfer payments also as an indirect effect on aggregate expenditures.

Although the government sector can and does make use of all three fiscal policy tools, it's often convenient to consolidate taxes and transfer payments into a single tool -- net taxes. Net taxes are the difference between taxes and transfer payments. Individually, taxes and transfer payments represent similar, but opposite flows between the household and government sectors. Taxes reduce disposable income and transfer payments increase disposable income. When combined, net taxes are then the net flow

between the household and government sectors; and thus capture the net impact on disposable income.

Expansionary and Contractionary

Fiscal policy comes in two basic varieties--expansionary and contractionary. Each is recommended to correct different problems created by business-cycle instability.

- **Expansionary Fiscal Policy:** The recommended fiscal policy to correct the problems of a business-cycle contraction is expansionary fiscal policy. Expansionary fiscal policy includes any combination of an increase government purchases, a decrease in taxes, or an increase in transfer payments. This fiscal policy alternative is intended to stimulate the economy by increasing aggregate expenditures and aggregate demand. It is primarily aimed at reducing unemployment.
- **Contractionary Fiscal Policy:** The recommended fiscal policy to correct the inflationary problems of a business-cycle expansion is contractionary fiscal policy. Contractionary fiscal policy includes any combination of a decrease government purchases, an increase in taxes, or a decrease in transfer payments. This fiscal policy alternative is intended to restrain the economy by decreasing aggregate expenditures and aggregate demand. It is primarily aimed at reducing inflation.

A Budgetary Word

A budget is a statement of expenditures and receipts. If expenditures exceed receipts, then a budget deficit occurs. If receipts exceed expenditures, then a budget surplus occurs. While households, businesses, and other entities have budgets, fiscal policy is most concerned with government budgets.

In particular, fiscal policy, especially that undertaken by the federal government, is commonly evaluated in terms of budget deficits and surpluses.

- With expansionary fiscal policy--through an increase in government spending, either purchases or transfer payments, or a decrease in taxes--then the budget moves in the direction of a deficit or at the very least a smaller surplus.

- With contractionary fiscal policy--through a decrease in government spending, either purchases or transfer payments, or an increase in taxes--then the budget moves in the direction of a surplus or at the very least a smaller deficit.

Full Employment Gaps

Fiscal policy is used to address business-cycle instability that gives rise to the problems of unemployment and inflation, that is, to close recessionary gaps and inflationary gaps.

- **Recessionary Gap:** A recessionary gap exists if the existing level of aggregate production is less than what would be produced with the full employment of resources. This gap arises during a business-cycle contraction and typically gives rise to higher rates of unemployment.
- **Inflationary Gap:** An inflationary gap exists if the existing level of aggregate production is greater than what would be produced with the full employment of resources. This gap typically arises during the latter stages a business-cycle expansion and typically gives rise to higher rates of inflation.

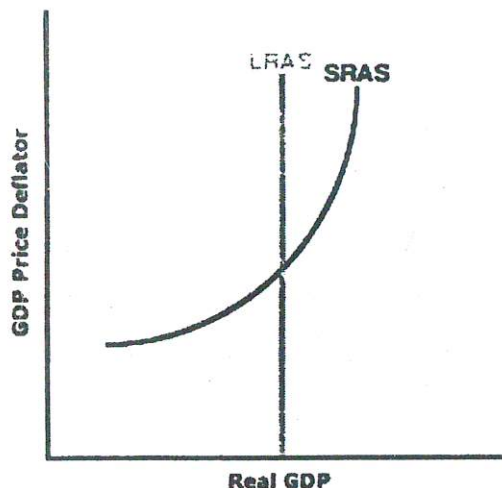


Figure 8 Full employment gaps

These two full-employment gaps are commonly illustrated using the aggregate market (AS-AD analysis). The exhibit to the right presents the standard aggregate market. The vertical long-run aggregate supply curve, labeled LRAS, marks full-employment real production. Long-run equilibrium in the aggregate market necessarily results in full-employment real production.

The positively-sloped short-run aggregate supply curve is labeled SRAS. Short-run equilibrium in the aggregate market occurs at the price level and real production corresponding to the intersection of the aggregate demand curve and this SRAS curve. Should short-run real production fall short of full-employment real production, then a recessionary gap results. Should it exceed full-employment real production, then an inflationary gap arises. However, to identify either gap an aggregate demand curve needs to be added to the graph.

- **Less Than Full Employment:** To include an aggregate demand curve that generates a recessionary gap for this aggregate market, click the [Recessionary Gap] button. Doing so reveals a short-run equilibrium level of real production that is less than full employment, which is a recessionary situation. Note that the aggregate demand curve intersects the SRAS curve at a real production level to the left of the LRAS curve. This means the short-run real production is less than full-employment real production. The difference between short-run equilibrium real production and full-employment real production is the recessionary gap.
- **Greater Than Full Employment:** To include an aggregate demand curve that generates an inflationary gap for this aggregate market, click the [Inflationary Gap] button. Doing so reveals a short-run equilibrium level of real production that is greater than full employment, which is an inflationary situation. Note that the aggregate demand curve now intersects the SRAS curve at a real production level to the right of the LRAS curve. This means the short-run real production is greater than full-employment real production. The difference between short-run equilibrium real production and full-employment real production is the inflationary gap.

Closing the Gaps

Fiscal policy is designed to close these two gaps by changing aggregate expenditures and shifting the aggregate demand curve. A recessionary gap is closed with a rightward shift of the aggregate demand curve and an inflationary gap is closed with a left ward shift.

To illustrate how this occurs, consider the exhibit to the right. The top panel presents a recessionary gap and the bottom panel an inflationary gap.

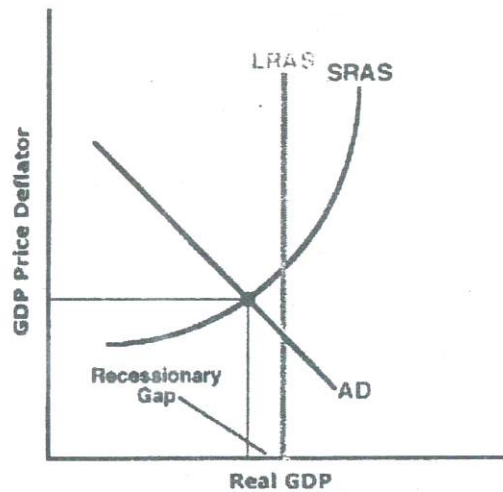


Figure 9 Inflationary gap

- Stimulation: The recessionary gap can be closed with expansionary fiscal policy--an increase in government purchases, a decrease in taxes, or an increase in transfer payments. This policy shifts the aggregate demand curve to the right and closes the gap. To illustrate how this works, click the [Expansionary Policy] button. If done correctly, the aggregate demand curve intersects the short-run aggregate supply curve at the full employment level of aggregate production indicated by the long-run aggregate supply curve.
- Restraint: The inflationary gap can be closed with contractionary fiscal policy--a decrease in government purchases, an increase in taxes, or a decrease in transfer payments. This policy shifts the aggregate demand curve to the left and closes the gap. To illustrate how this works, click the [Contractionary Policy] button. If done correctly, the aggregate demand curve also intersects the short-run aggregate supply curve at the full employment level of aggregate production and the long-run aggregate supply curve.

Policy Lags

The use of fiscal policy encounters time lags, or policy lags, between the onset of an economic problem, such as a business-cycle contraction, and the full impact of the policy designed to correct the problem. A business-cycle contraction that hits the economy on January 1st cannot be corrected with fiscal policy by January 2nd.

Four types of policy lags are common.

- **Recognition Lag:** This is the time it takes to identify the existence of a problem. It takes time to obtain economic measurements. Once data are obtained, it takes time to analyze and evaluate the data to document the problem.
- **Decision Lag:** This is the time it takes to decide on a suitable course of action, then pass whatever legislation, laws, or administrative rules are needed. For fiscal policy, this requires an act of Congress, signed into law by the President. These decisions could take days, weeks, or even months.
- **Implementation Lag:** This is the time it takes to implement the chosen policy. A spending change requires actions by dozens, hundreds, or even thousands of different government agencies, all of which need to decide on to change their budgets. A tax change requires the distribution of new tax rates and responses by those paying the taxes. The implementation of fiscal policy is also likely to take weeks if not months.
- **Impact Lag:** This lag is the time it takes any change initiated by a government policy to actually impact the producers and consumers in the economy. A key part of the impact lag is the multiplier. A change in government spending or taxes must work its way through the economy, triggering subsequent changes in production and income, which induces changes in consumption, which causes more changes in production and income, which induces further changes in consumption. An impact lag of one to two years is not uncommon.

The goal of fiscal policy is to stabilize the business cycle, to counter contractions and expansions. However, policy lags can cause fiscal policy to destabilize the economy. It can worsen the ups and downs of the business cycle. The impact of expansionary fiscal policy to correct a business-cycle contraction, for example, might occur during the ensuing expansion, which can then over stimulate the economy and cause inflation. Or the impact of contractionary fiscal policy designed to reduce inflation might not occur until the onset of a subsequent contraction. In both cases, the resulting policy is not counter-cyclical, but pro-cyclical.

Automatic Stabilizers

Fiscal policy is intended to be discretionary. That is, policy makers decide to change government spending and taxes in response to business-cycle conditions.

However, the economy also has a built-in "fiscal" mechanism that acts to automatically reduce the expansions and contractions of the business cycle.

This mechanism is termed automatic stabilizers. Automatic stabilizers are taxes and transfer payments that depend on the level of aggregate production and income such that they automatically dampen business-cycle instability without the need for discretionary policy action.

Automatic stabilizers work AUTOMATICALLY. There is no need for Congress or the President to enact legislation, pass bills, or to undertake any other policy action. These stabilizers are built into the structure of the economy. The government sets up the rules and criteria under which taxes and transfer payments work. If people meet the criteria, then they pay the taxes or receive the transfer payments. The amount of each depends on the number of people meeting the criteria, which is dependent on business cycle activity.

Let's take a closer look at each of the two automatic stabilizers -- taxes and transfer payments.

- Taxes: Income taxes, especially federal income taxes, largely depend on the level of aggregate production and income in the economy. If production and income rise, then tax collections also rise. Income taxes also tend to be progressive -- the proportion of taxes paid increases with income.

As such, people pay an increasing proportion of income in taxes when the economy expands, leaving proportionally less disposable income available for consumption expenditures and further expansionary stimulation. Moreover, people pay a decreasing proportion of income in taxes when the economy contracts, leaving proportionally more disposable income available for consumption expenditures.

- Transfer Payments Transfer payments, including Social Security to the elderly, unemployment compensation to the unemployed, and welfare to the poor, also depend on the level of aggregate production and income. These, however, work opposite to taxes. If aggregate income rises, transfer payments tend to fall as people are less likely to retire, be unemployed, or fall into the ranks of the poor.

As the economy expands, and aggregate income increases, people receive increasingly fewer transfer payments. The consuming public has proportionally less disposable income for consumption expenditures and further expansionary stimulation. As the economy contracts, transfer payments rise; providing lessening the drop in disposable income that would have occurred otherwise.

Automatic stabilizers largely came into existence in response to the Great Depression of the 1930s. In the decade's preceeding the Great Depression, business cycles tended to be particularly volatile. In the decades following the Great Depression, business cycles were substantially more subdued. Automatic stabilizers are given at least partial credit for the increased stability of recent times.

Politics: Two Views

Politics are never far from economics, especially when policies are involved. Such is the case for fiscal policy. In some cases the federal government leans philosophically toward expansionary fiscal policy and in other cases toward contractionary fiscal policy. The inclination for one type of policy or the other often results from political philosophy--conservative and liberal.

- Conservatives tend to favor individual choices over government, producers over consumers, and lower inflation over lower unemployment. Conservatives tend to prefer contractionary fiscal supply. This keeps inflation rates down, even though higher unemployment rates might result.
- Liberals tend to favor government restrictions on individual choices, consumers over producers, and lower unemployment over lower inflation. Liberals tend to prefer expansionary fiscal supply. This ensures lower unemployment rates, even though higher inflation rates might result.

The federal government, especially the President, tends to lean more in one political direction or the other. Some Presidents have tended to be more liberal, using fiscal policy to keep unemployment rates low. Others have tended to be more conservative, using fiscal policy to keep inflation rates low. While Presidents, in theory, can be absolutely, positively, completely neutral when it comes to politics, such seldom happens.

Activity 3

1. Discuss various approaches to business cycles. Differentiate between exogenous and endogenous models.
2. What do you understand by Kaldor's non linear model?
3. write short note on the following:
 - Fiscal policy
 - Monetary policy
 - Economic policy
 - Credit/Debt cycle

3.7 SUMMARY

This unit is about business cycles and related concepts. After brief introduction various approaches to business cycles are discussed including exogenous vs. endogenous model, Keynesian, Australian school, Credit/Debt cycle, RBC theory etc followed by Schumpeter theory of business cycle. Kaldor's non linear cycle is discussed as it is distinguishable from most other contemporary treatments since it utilizes non-linear functions. In the Samuelson–Hicks business cycle model, investment is determined by the growth in income, through the principle of acceleration. Next area of concern was implication of policies to control business cycles in which monetary policy is described as controlling of the quantity of money in circulation for the expressed purpose of stabilizing the business cycle and reducing the problems of unemployment and inflation. On the other hand Fiscal policy is based on the presumption that aggregate expenditures, especially business investment, are the primary source of business-cycle instability.

3.8 FURTHER READINGS

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Economics**

**DISTANCE EDUCATION
SELF INSTRUCTIONAL MATERIAL**

BLOCK : III- THEORY OF MONEY

Unit-1 Classical approaches to demand of money

Unit 2 Post Keynesian approaches to demand for
money

1.1 INTRODUCTION

The demand for money is the desired holding of money balances in the form of cash or bank deposits. Money is dominated as store of value by interest-bearing assets. However, money is necessary to carry out transactions, or in other words, it provides liquidity. This creates a trade-off between holding money versus holding other assets. The demand for money is a result of this trade-off regarding the form in which a person's wealth should be held. In macroeconomics motivations for holding one's wealth in the form of money can roughly be divided into the transaction motive and the asset motive. These can be further subdivided into more micro economically founded motivations for holding money.

Generally, demand for money increases with the level of nominal output (price level times real output) and decreases with the nominal interest rate. The demand for *real balances* is defined as the amount of money demanded divided by the price level. For a given money supply the locus of income-interest rate pairs at which money demand equals money supply determines the LM curve.

The magnitude of volatility of money demand has crucial implications for the optimal way in which a Central Bank should carry out monetary policy and its choice of a nominal anchor.

Conditions under which the LM curve is flat, so that changes in money supply have no stimulatory effect (a liquidity trap) play an important role in Keynesian theory.

A typical *money-demand function* may be written as

$$M^d = P * L(R, Y)$$

where M^d is amount of money demanded, P is the price level, R is the nominal interest rate and Y is real output. An alternate name for a term such as $L(R, Y)$ is the liquidity preference function.

In this unit we will discuss the classical approaches to demand for money.

1.2 QUANTITY THEORY APPROACH

The concept of the Quantity Theory of Money (QTM) began in the 16th century. As gold and silver inflows from the Americas into Europe were being minted into coins,

there was a resulting rise in inflation. This led economist Henry Thornton in 1802 to assume that more money equals more inflation and that an increase in money supply does not necessarily mean an increase in economic output. Here we look at the assumptions and calculations underlying the QTM, as well as its relationship to monetarism and ways the theory has been challenged.

In monetary economics, the quantity theory of money is the theory that money supply has a direct, positive relationship with the price level.

The theory was challenged by Keynesian economics, but updated and reinvigorated by the monetarist school of economics. While mainstream economists agree that the quantity theory holds true in the long-run, there is still disagreement about its applicability in the short-run. Critics of the theory argue that money velocity is not stable and, in the short-run, prices are sticky, so the direct relationship between money supply and price level does not hold.

Alternative theories include the real bills doctrine and the more recent fiscal theory of the price level.

1.2.1 Origins and development of the quantity theory

The quantity theory descends from Copernicus, followers of the School of Salamanca, Jean Bodin, , and various others who noted the increase in prices following the import of gold and silver, used in the coinage of money, from the New World. The "equation of exchange" relating the supply of money to the value of money transactions was stated by John Stuart Mill who expanded on the ideas of David Hume. The quantity theory was developed by Simon Newcomb, Alfred de Foville, Irving Fisher, and Ludwig von Mises in the latter 19th and early 20th century. It was influentially restated by Milton Friedman in the post-Keynesian era.

Academic discussion remains over the degree to which different figures developed the theory. For instance, Bieda argues that Copernicus's observation

Money can lose its value through excessive abundance, if so much silver is coined as to heighten people's demand for silver bullion. For in this way, the coinage's estimation vanishes when it cannot buy as much silver as the money itself contains. The solution is to mint no more coinage until it recovers its par value.

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Historically, the main rival of the quantity theory was the real bills doctrine, which says that the issue of money does not raise prices, as long as the new money is issued in exchange for assets of sufficient value.

Equation of exchange

In its modern form, the quantity theory builds upon the following definitional relationship.

$$M \cdot V_T = \sum_i (p_i \cdot q_i) = \mathbf{p}^T \cdot \mathbf{q}$$

where

M is the total amount of money in circulation on average in an economy during the period, say a year.

V_T is the transactions' velocity of money, that is the average frequency across all transactions with which a unit of money is spent. This reflects availability of financial institutions, economic variables, and choices made as to how fast people turn over their money.

p_i and q_i are the price and quantity of the i -th transaction.

\mathbf{p} is a vector of the p_i .

\mathbf{q} is a vector of the q_i .

Mainstream economics accepts a simplification, the equation of exchange:

$$M \cdot V_T = P_T \cdot T$$

where

P_T is the price level associated with transactions for the economy during the period

T is an index of the real value of aggregate transactions.

The previous equation presents the difficulty that the associated data are not available for all transactions. With the development of national income and product accounts, emphasis shifted to national-income or final-product transactions, rather than gross transactions. Economists may therefore work with the form

$$M \cdot V = P \cdot Q$$

where

V is the velocity of money in final expenditures.

Q is an index of the real value of final expenditures.

As an example, M might represent currency plus deposits in checking and savings accounts held by the public, Q real output with P the corresponding price level, and $P \cdot Q$ the nominal (money) value of output. In one empirical formulation, velocity was taken to be "the ratio of net national product in current prices to the money stock".^[15]

Thus far, the theory is not particularly controversial. But there are questions of the extent to which each of these variables is dependent upon the others. Without further restrictions, it does not require that change in the money supply would change the value of any or all of P , Q , or $P \cdot Q$. For example, a 10% increase in M could be accompanied by a 10% decrease in V , leaving $P \cdot Q$ unchanged.

A rudimentary theory

The equation of exchange can be used to form a rudimentary theory of inflation.

$$P = \frac{M \cdot V}{Q}$$

If V and Q were constant, then:

$$\frac{dP}{P} = \frac{dM}{M}$$

and thus

$$\frac{dP/P}{dt} = \frac{dM/M}{dt}$$

where

t is time.

That is to say that, if V and Q were constant, then the inflation rate would exactly equal the growth rate of the money supply.

The Quantity Theory of Money seeks to establish that, in the long run, the price level/ rate of inflation is determined by the level/ rate of increase of the money supply. Although the Quantity Theory of Money is an extremely old proposition, it was first formalised in the early part of the 20th century by Yale economist, Irving Fisher and later by a group of Cambridge economists, Alfred Marshall and most notably A. C. Pigou.

(a) Fisher's Transactions Approach

This approach first emerged in Fisher's book *The Purchasing Power of Money* (1911). For most economists of that period, money was viewed solely as a means of exchange. The only reason for holding money was to facilitate transactions. Fisher's analysis commences with a simple identity (a statement that is by definition true), sometimes referred to as the *equation of exchange*.

$MV_t \equiv PT$ where

- M = Money Supply
- V_t = Transactions Velocity of Circulation of money (the number of times the money stock changes hands per period).
- P = Price level.
- T = The number of Transactions undertaken per period

Note that

MV_t = money stock * number of times the money stock is spent per period
= total spending per period.

PT = Price of goods & services * volume of goods & services bought per period
= total expenditure per period.

Thus, at first sight, the Quantity Theory is an innocuous tautology. To turn this identity into a theory of price determination, Fisher made further assumptions about the nature of each variable.

- M, the money stock was taken to be exogenously determined by the monetary authorities
- and independent of the other 3 variables
- V_t , the velocity of circulation was assumed to be more or less constant and was determined by conditions in the financial system that tend to change very slowly. Again, V was thought to be independent of M, P & T.
- T, the number of transactions per period was also taken as fixed. Recall that Classical scholars believed that in the long term, output tended to be at or near the full employment level. The number of transactions was viewed as fixed at any given level of income.
- P, the price level was determined by the interaction of the 3 other factors.

Thus,

$$MV_t = PT$$

This suggests that the price level is determined by the money supply.

Note, T is likely to be extremely difficult to calculate or even conceptualize and V is not an independent variable. V_t is a residual which is generally derived given knowledge of the other 3. i.e. $V_t = (PT)/M$.

(b) The Cambridge Cash Balance Approach.

The Cambridge economists Marshall Pigou, Robertson and Keynes developed cash balance approach to the quantity theory of money. It is an improved design of Fisherian quantity theory of money put forward by an American economist Irving Fisher. The Cambridge cash balance approach considers the demand for money not as a medium of exchange but as a store of value. According to the cash balance approach, the value of money is determined by the demand for and supply of money.

The demand for money is the determination of the people to retain the purchasing power to obtaining goods and service at a particular moment of time. The demand for money or cash balances thus is induced by household and businesses to keep the wealth in the form of money to pay for the goods and also to hold assets in liquid form so that they can meet any unexpected and unforeseen developments. The demand for money is a certain portion of annual national income which people want to hold in cash or in the form of money for the transaction and precautionary motives.

Since the supply of money at a particular moment of time is fixed therefore the changes in the price level depends upon the changes in demand for holding money or cash balances.

Economists Alfred Marshall, A.C. Pigou, and John Maynard Keynes (before he developed his own, eponymous school of thought) associated with Cambridge University, took a slightly different approach to the quantity theory, focusing on money demand instead of money supply. They argued that a certain portion of the money supply will not be used for transactions; instead, it will be held for the convenience and security of having cash on hand. This portion of cash is commonly represented as k , a portion of nominal income ($P \cdot Y$). The Cambridge economists also thought wealth would play a role, but wealth is often omitted for simplicity. The Cambridge equation is thus:

$$M^d = k \cdot P \cdot Y$$

Assuming that the economy is at equilibrium ($M^d = M$), Y is exogenous, and k is fixed in the short run, the Cambridge equation is equivalent to the equation of exchange with velocity equal to the inverse of k :

$$M \cdot \frac{1}{k} = P \cdot Y$$

The Cambridge version of the quantity theory led to both Keynes's attack on the quantity theory and the Monetarist revival of the theory

Fisher's approach can be viewed as deterministic. Essentially, Fisher argued that, given the full employment volume of transactions and the speed with which the financial system could process payments, the quantity of money that agents *required* to hold was effectively determined.

Marshall, Pigou and colleagues took a radically different tack. Like Fisher, the Cambridge School assumed that money was only held to expedite transactions and had no further purpose. Thus, if the money supply increased, agents holding the increased money stock would seek to get rid of it. However, the emphasis in this approach concentrated on establishing the quantity of money that agents would voluntarily *desire* to hold. The Cambridge school were in effect attempting to set out a theory of the *demand* for money.

David Laidler (1985) puts it thus

"In the Cambridge approach the principle determinant of people's "taste" for money holding is the fact that it is a convenient asset to have, being universally acceptable in exchange for goods and services. The more transactions an individual has to undertake, the more cash he will want to hold and to this extent the approach is similar to Fisher. The emphasis, however, is on want to hold, rather than have to hold; and this is the basic difference between Cambridge monetary theory and the Fisher framework."

The Cambridge approach emphasises that there are alternatives to holding money in the shape of shares and bonds. These assets yield a return which can be viewed as the opportunity cost of holding money. As interest rates rise, agents will economise on money holdings and vice versa. Another factor that will influence money holdings is the expected rate of inflation. If inflation is expected to be high, then the purchasing power of

money will fall. This will prompt agents to buy securities or commodities as a hedge against inflation.

We can also set out the Cambridge cash balance approach as follows

$$M^D = kPy$$

$$M^D = M^S$$

Where

$$k = k(E(\text{inf}), r, u)$$

This sets out that M^D is some fraction k of nominal GDP where k depends on expected inflation, interest rates/returns and u , a set of unspecified factors which may influence money demand. Note that r is a vector of returns reflecting an appreciation that agents had a choice of assets such as shares and bonds.

The Cambridge cash balance equation can be recast to facilitate comparison with Fisher's equation of exchange.

$$M^S = kPy = (1/V)Py.$$

In this formulation, V can be construed as the income velocity of circulation. As with the Fisher approach, k was not regarded as fixed but rather was viewed as a stable and predictable function of its determinants. In the long run, changes in the money stock would eventually lead to proportional changes in the price level.

The Cambridge approach is universally regarded as the superior account and it forms the basis of later developments in the demand for money by Keynes, Milton Friedman and others.

(c) The Transmission Mechanism

The transmission mechanism sets out the process by which a change in the money stock affects economic activity. In the classical context this requires a clear explanation of how $\Delta M \rightarrow \Delta P$. Classical economists argued that there would be both a direct and indirect mechanism. The direct mechanism is the direct influence of a change in M on expenditure and the price level whilst the indirect mechanism operates through the interest rate.

To understand this fully, we must be more specific about the definition of money. Money can be narrowly conceived of as notes & coins in circulation. However, bank deposits can also be properly regarded as a component of the money stock. Classical

economists focussed on the ability of banks to create money through the expansion of loans. Fisher restated his equation of exchange to incorporate the banking sector. Thus,

$$PT \equiv MV + M'V'$$

Where M is quantity of currency (termed primary money by Fisher)

V is the velocity of circulation of currency

M' is the quantity of bank deposits

and V' is the velocity of circulation of deposit money

Assume that M (the quantity of primary money) rises. This could be achieved by the central bank buying bonds and securities from the non bank private sector and paying for these purchases with cash. This would raise prices directly via the direct mechanism. Fisher demonstrated that the emergence of inflation would result in a divergence between the real and nominal rates of interest.

$$R_t = r_t + \Delta P_t^e$$

where R is the nominal rate of interest,

r is the real rate of interest

and ΔP_t^e is the expected rate of inflation

The Classical theorists viewed the interest rate as '*the reward for waiting*'. If agents were to be persuaded to forego current consumption, they would require to be compensated with greater a greater volume of consumption in a later period. Thus, the real rate of interest reflects the reward in terms of actual goods and services required to persuade agents to save. If $r = 5\%$, this suggests that agents require a 5% more goods and services in future if they are to be tempted to forego 1 unit of current consumption.

Note that in the preceding account, prices remained constant. If prices are rising by 5%, the nominal rate of interest would have to be 10% in order to ensure a 5% rise in actual goods and services as a reward for waiting.

Hence, Fisher argued that an increase in the primary money stock would initially serve to drive up prices. The increase in inflation would cause the nominal rate of interest to rise above the real rate. However, Fisher contended that the rise in the nominal rate would be insufficient to maintain the real rate at its equilibrium level. Thus, following a price increase, the real rate of interest would fall. This would result in an increase in the demand for loans by borrowers.

Fisher argued that banks would increase the volume of loans at the lower real rate thus increasing the volume of deposits, M' . The expenditure made possible by these loans drives up the price level. Although in the short run, this increased spending may increase the number of transactions, the long run impact of the direct and indirect mechanisms would result in a rise in the price level proportional to the rise in the money supply.

1.2.2 QTM in a Nutshell

The Quantity Theory of Money states that there is a direct relationship between the quantity of money in an economy and the level of prices of goods and services sold. According to QTM, if the amount of money in an economy doubles, price levels also double, causing inflation (the percentage rate at which the level of prices is rising in an economy). The consumer therefore pays twice as much for the same amount of the good or service.

Another way to understand this theory is to recognize that money is like any other commodity: increases in its supply decrease marginal value (the buying capacity of one unit of currency). So an increase in money supply causes prices to rise (inflation) as they compensate for the decrease in money's marginal value.

The Theory's Calculations

In its simplest form, the theory is expressed as:

$$MV = PT \text{ (the Fisher Equation)}$$

Each variable denotes the following:

M = Money Supply

V = Velocity of Circulation (the number of times money changes hands)

P = Average Price Level

T = Volume of Transactions of Goods and Services

The original theory was considered orthodox among 17th century classical economists and was overhauled by 20th-century economists Irving Fisher, who formulated the above equation, and Milton Friedman. It is built on the principle of "equation of exchange": Amount of Money x Velocity of Circulation = Total Spending

Thus if an economy has US\$3, and that \$3 were spent five times in a month, total spending for the month would be \$15.

QTM Assumptions

QTM adds assumptions to the logic of the equation of exchange. In its most basic form, the theory assumes that V (velocity of circulation) and T (volume of transactions) are constant in the short term. These assumptions, however, have been criticized, particularly the assumption that V is constant. The arguments point out that the velocity of circulation depends on consumer and business spending impulses, which cannot be constant.

The theory also assumes that the quantity of money, which is determined by outside forces, is the main influence of economic activity in a society. A change in money supply results in changes in price levels and/or a change in supply of goods and services. It is primarily these changes in money stock that cause a change in spending. And the velocity of circulation depends not on the amount of money available or on the current price level but on *changes* in price levels.

Finally, the number of transactions (T) is determined by labor, capital, natural resources (i.e. the factors of production), knowledge and organization. The theory assumes an economy in equilibrium and at full employment.

Essentially, the theory's assumptions imply that the *value* of money is determined by the *amount* of money available in an economy. An increase in money supply results in a decrease in the value of money because an increase in money supply causes a rise in inflation. As inflation rises, the purchasing power, or the value of money, decreases. It therefore will cost more to buy the same quantity of goods or services.

Money Supply, Inflation and Monetarism

As QTM says that quantity of money determines the value of money, it forms the cornerstone of monetarism.

Monetarists say that a rapid increase in money supply leads to a rapid increase in inflation. Money growth that surpasses the growth of economic output results in inflation as there is too much money behind too little production of goods and services. In order to curb inflation, money growth must fall below growth in economic output.

This premise leads to how monetary policy is administered. Monetarists believe that money supply should be kept within an acceptable bandwidth so that levels of inflation can be controlled. Thus, for the near term, most monetarists agree that an

increase in money supply can offer a quick-fix boost to a staggering economy in need of increased production. In the long term, however, the effects of monetary policy are still blurry.

Less orthodox monetarists, on the other hand, hold that an expanded money supply will not have any effect on real economic activity (production, employment levels, spending and so forth). But for most monetarists any anti-inflationary policy will stem from the basic concept that there should be a gradual reduction in the money supply. Monetarists believe that instead of governments continually adjusting economic policies (i.e. government spending and taxes), it is better to let non-inflationary policies (i.e. gradual reduction of money supply) lead an economy to full employment.

1.2.3 QTM Re-Experienced

John Maynard Keynes challenged the theory in the 1930s, saying that increases in money supply lead to a decrease in the velocity of circulation and that real income, the flow of money to the factors of production, increased. Therefore, velocity could change in response to changes in money supply. It was conceded by many economists after him that Keynes' idea was accurate.

QTM, as it is rooted in monetarism, was very popular in the 1980s among some major economies such as the United States and Great Britain under Ronald Reagan and Margaret Thatcher respectively. At the time, leaders tried to apply the principles of the theory to economies where money growth targets were set. However, as time went on, many accepted that strict adherence to a controlled money supply was not necessarily the cure-all for economic malaise.

1.2.4 Classical dichotomy at a glance

1. Theory of value with marginal analysis. $Y, w, (W/P), r$
2. Theory of money with trade cycle and price level, $W P P Y i$ (money rate of i)

Fishers Version (equation of exchange)

P' average price of transaction T

$P'T$ is the monetary value of all transactions.

V' rate that a unit of M changes hands

In money using economy where non-monetary transactions are insignificant

$$MV = P'T$$

T is determined in the real sector, tends towards T^* (fullemp), V' is given in short run.

M does not depend on $P'T$ (closed economy). In long run only

$$i = r + \frac{dP}{P} = r + \frac{dM}{M}$$

Income version of Fisher

P' measures also intermediate transactions. $PY = \text{GDP}$ where P is price index. V becomes income velocity of circulation.

Cambridge cash balance version

$M = kPY$ - Cambridge approach. k - Desired money to money income ratio.

If overnight the money supply was to double. The price level would also double.

Money is mutual; money things don't affect real things. Assumption:

1. k is stable in short run
2. M is exogenously given - it is now the creation of the money system. So it is not that true.

The rate of inflation \dot{p} .

The money using economy is a good thing.

Money is not only a medium of exchange but a temporary abode of purchasing power. So there was a demand for money. This was mainly influenced by national income (also by r, but not here)

Only in full monetary equilibrium $M = M_d$.

M_s and M_d are brought into equilibrium by changes in P as Y is already Y^* (cash-balance effect). Hume said that in long-run money is neutral (M_s represents the value of economy). When country imports gold initially wages in exporting sectors rise (terms of trade change), but these workers will bid up the general price level.

Marshallian-Wicksellian monetary transmission mechanism

This approach was invented because cash-balance could not explain open market operations. But they said again that monetary things could influence real interest rate in the short run.

Forced savings will occur. So k is a function of r monetary. As monetary r tends to natural in LR, k is stable. Friedman carried it on. It looked of excessive M_s expansion because the Bank tries to maintain r at unnatural level. He said one can't judge whether

interest is high or low. It should be natural. A full-blown inflation will emerge (Bank increases M_s , prices and r will start going up). Then i and r will be expected to be different. M_s targets should be better ones. He told high interest is the result of lax monetary policy (paradox with Keynes) as inflation is high. Keynes said also interest should not be kept too low, but when not at full employment r must be below r_n and thus M_s should be expanded etc.

The monetary transmission mechanism

$MV=PY$ restrict this equation - doubling of M will lead to a doubling of P .

The Cambridge approach $M_d=kPY$ has advantage k - the money the individuals wish to hold at their income. That is the demand relation. The supply was given exogenously.

Assume at the beginning $M_s=M_d=kPY$, when M_s increases there is imbalance. Individuals find themselves with money balances that are excessive.

$M_s-M_d = -ive$. $Y_d-Y^* = +ive$. Y^* is max. output, so now there is no possible extra output. So the price level will rise. If the supply of money is oneoff, the prices will not rise infinitely. As prices rise M_d will rise until $M_d=M_s$.

Quantity theory of money in international context

Price - Specie - Flow mechanism.

$X < M(\text{imports})$

This drains country's gold reserves.

The price of British produced goods falls, the price of foreign goods rises. This will increase British exports.

1.2.5 Quantity theory and evidence

As restated by Milton Friedman, the quantity theory emphasizes the following relationship of the nominal value of expenditures PQ and the price level P to the quantity of money M :

$$(1) PQ = f(M^+)$$

$$(2) P = g(M^+)$$

The plus signs indicate that a change in the money supply is hypothesized to change nominal expenditures and the price level in the same direction (for other variables held constant).

Friedman described the empirical regularity of substantial changes in the quantity of money and in the level of prices as perhaps the most-evidenced economic phenomenon on record. Empirical studies have found relations consistent with the models above and with causation running from money to prices. The short-run relation of a change in the money supply in the past has been relatively more associated with a change in real output Q than the price level P in (1) but with much variation in the precision, timing, and size of the relation. For the *long-run*, there has been stronger support for (1) and (2) and no systematic association of Q and M .

Principles

The theory above is based on the following hypotheses:

1. The source of inflation is fundamentally derived from the growth rate of the money supply.
2. The supply of money is exogenous.
3. The demand for money, as reflected in its velocity, is a stable function of nominal income, interest rates, and so forth.
4. The mechanism for injecting money into the economy is not that important in the long run.
5. The real interest rate is determined by non-monetary factors: (productivity of capital, time preference).

Decline of money-supply targeting

An application of the quantity-theory approach aimed at removing monetary policy as a source of macroeconomic instability was to target a constant, low growth rate of the money supply. Still, practical identification of the relevant money supply, including measurement, was always somewhat controversial and difficult. As financial intermediation grew in complexity and sophistication in the 1980s and 1990s, it became more so. As a result, some central banks, including the U.S. Federal Reserve, which had

targeted the money supply, reverted to targeting interest rates. But monetary aggregates remain a leading economic indicator.

1.3 LIQUIDITY PREFERENCE

Liquidity preference in macroeconomic theory refers to the demand for money, considered as liquidity. The concept was first developed by John Maynard Keynes in his book *The General Theory of Employment, Interest and Money* (1936) to explain determination of the interest rate by the supply and demand for money. The demand for money as an asset was theorized to depend on the interest foregone by not holding bonds. Interest rates, he argues, cannot be a reward for savings as such because, if a person hoards his savings in cash, keeping it under his mattress say, he will receive no interest, although he has nevertheless, refrained from consuming all his current income. Instead of a reward for savings, interest in the Keynesian analysis is a reward for parting with liquidity.

According to Keynes, demand for liquidity is determined by three motives:

1. The transactions motive: people prefer to have liquidity to assure basically transactions, for their income is not constantly available. The amount of liquidity demanded is determined by the level of income: the higher income, the more money demanded for carrying out increased spending.
2. The precautionary motive: people prefer to have liquidity in the case of social unexpected problems that need unusual costs. The amount of money demanded also grows with the income.
3. Speculative motive: people retain liquidity to speculate that bond prices will fall. When the interest rate decreases people demand more money to hold until the interest rate increases, which would drive down the price of an existing bond to keep its yield in line with the interest rate. Thus, the lower the interest rate, the more money demanded (and vice versa).

The liquidity-preference relation can be represented graphically as a schedule of the money demanded at each different interest rate. The supply of money together with the liquidity-preference curve in theory interact to determine the interest rate at which to quantity of money demanded equals the quantity of money supplied (see IS/LM model).

1.3.1 Venture Capital

In the venture capital world, the term "liquidity preference" refers to a clause in a term sheet specifying that, upon a liquidity event, the investors are compensated two ways:

1. First, they receive back their initial investment (or perhaps a multiple of it), and any declared but not yet paid dividends
2. Second, the investors and all other owners (e.g. founders, etc.) divide whatever remains of the purchase price according to their ownership of the firm being sold, etc.

Example:

- A founder owns a firm which is valued at \$100,000, and venture capitalists buy new shares for \$50,000 (thus making the firm worth \$150,000, and giving the VCs 33% of it)
- dividends of \$20,000 for class A shareholders (i.e. the VCs) are declared, but not paid
- the firm is sold to a new owner for \$400,000
- the venture capitalists take (\$20,000) of dividends out, leaving \$380,000
- the VCs then take (\$50,000) of their initial investment out, leaving \$330,000
- the VCs then take 33% of the money (\$110,000), leaving 66% for the founder (\$220,000)
- the VCs have made (\$180,000) from a minnow Investment of \$50,000 a hefty 3.6 fold return.

1.3.2 An Exercise in Keynesian Liquidity-Preference Theory and Policy

According to Keynes, the speculative demand for money M_{spec} is sensitive to changes in the interest rate. In other words, it is interest-elastic—and extremely so at very low rates of interest. (The speculative demand for money is contrasted with the transactions demand M_{trans} , the latter being a stable function of income.) In ISLaMic Art, the speculative demand for money gives rise to an LM curve that consists of three distinct “regions.” On the axes provided, show how these regions relate to the demand for

speculative balances. Label the three regions Extreme Keynesian, Intermediate, and Classical.

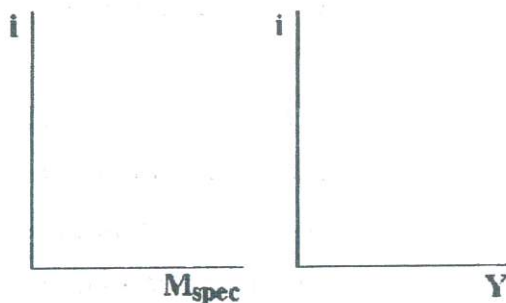


Figure 1

Theory:

In the Keynesian model, the accumulation of large speculative balances implies that people expect the rate of interest to (rise, fall). They want or do not want to hold bonds because the interest rate and bond prices are (directly, inversely) related to one another. If the supply of money remains constant, the high speculative demand implies a (high, low) level of transactions balances, which corresponds to a (high, low) level of income. If, with a given money supply and an equilibrium rate of interest, people are suddenly overcome by the fetish of liquidity, the demand for speculative balances would shift (rightward, leftward), putting (upward, downward) pressure on the rate of interest.

Policy:

If people are suddenly overcome by the fetish of liquidity, the Federal Reserve should increase or decrease the money supply. Once full-employment income has been achieved, the Fed's policy rule of "Print money to (hold, spend), but not money to (hold, spend)" may not be a viable policy rule because the speculative demand for money is too (stable, unstable). Besides, the Fed may not have an unambiguous indicator of the needed policy: its timely information includes (the interest rate, income) but not (the interest rate, income).

1.4 DEMAND FOR MONEY

To begin it is assumed, as in the Classical Model, that the supply of money (M_1) is, in effect, fixed by the monetary authorities. The demand for money in the Keynesian Model, however, is not the same. Assuming income can be held either as money, spent

or converted into interest earning assets (bonds), for Keynes there were three main reasons for holding money as cash:

- i) Transaction demand
- ii) Precautionary demand;
- iii) Speculative demand; and,
- iv) Total demand.

i) Transactional Demand

Money would be held as a medium of exchange for use in transactions, i.e. to pay bills. Transactional demand would vary positively with the volume of transactions (T_D) and income was assumed to be a good measure of T_D . Further there would be pressure to 'economize' on one's transactional cash balance. That pressure emanated from the rate of interest. While there are brokerage and other fees associated with buying bonds (making small purchases less attractive, i.e. the 'real' rate of return being $r - f$ where f stands for fees), the higher the interest rate the higher the final rate of return and so individuals and households are more likely to compress their transactional demand for money as the interest rate rises. In conclusion, T_D varies positively with income and negatively with the rate of interest.

While Keynes did not stress the impact of r on T_D businesses through their cash management practices do. Firms with a large volume of transactions will reduce their T_D as r rises.

ii) Precautionary Demand

Individuals always have a demand for cash on hand to meet emergencies - medical or repairs. Accordingly some cash will always be held in cash and Keynes assumed the amount of precautionary demand (P_D) would vary positively with income. To simplify our analysis it will be assumed that P_D can be subsumed under T_D as an 'unexpected' transaction demand for money.

iii) Speculative Demand

Speculative demand for money (S_D) represented an original contribution to the theory of money by Keynes. He argued that given uncertainties about future interest rates and the relationship between interest rates and price of bonds (specifically capital loss or gain on their value) meant that there would be times when individuals would hold on to

cash. If you buy a bond today you are committing part of your income to something that will pay a given rate of interest say r_1 . The price of the bond is sometimes called its yield measured by the purchase price – say \$1,000 and its coupon or interest rate is, say 5%. If tomorrow the interest increases to r_2 – say 10% - you will, in effect, lose $(r_2 - r_1)$. Furthermore, if you try and sell your old bond its price must be decreased to yield an effective rate of r_2 . The difference in what you paid for the bond and the price at which you must sell it to generate an effective yield of r_2 is called a ‘capital loss’. For example, while the old bond cost you \$1,000 and generates a 5% return, the bond could be sold tomorrow only for \$500 if the buyer is to get the going rate of 10%.

Keynes argued that the uncertainty would lead some individuals to hold onto cash in order to earn a higher rate tomorrow and avoid capital losses. And vice versa, if interest rates were expected to fall then speculative demand for money would fall as higher yielding bonds are purchased today in the hope both of a lower interest rate tomorrow and the chance of ‘capital gains’. Thus a \$1,000 bond yielding 10% will sell for \$2,000 if the interest rate drops to 5% tomorrow.

In effect, Keynes assumed that different individuals had different views about future change in the interest rate. Each had preconceptions of what was the ‘normal’ rate of interest. Those who thought ‘the normal rate’ was higher than today’s rate would tend to have a higher SD; those who thought the normal rate was less than today’s rate would have a lower SD. At ‘very’ lower current rates most individuals will have a high SD in anticipation that rates will rise tomorrow and to avoid capital losses. If enough individuals hold on to cash a ‘liquidity trap’ is reached. This is the point at which the demand for money (liquidity) is perfectly elastic with respect to the interest rate. Such a situation arises when the yield on income earning assets is so low that the risk of holding such assets is so high (capital losses if rates rise) that investors prefer to hold on to any increase in the money supply in liquid form.

iv) Total Demand

Total demand for money in the Keynesian Model or $M_D = T_D + P_D + S_D$ where T_D and P_D vary positively with income and negatively with respect to interest rate while S_D does not vary with income but negatively with respect to interest rates. Taken together we can say:

$$M_d = L(Y, r)$$

And if we assume the function is linear then

$$M_d = c_0 + c_1 Y - c_2 r \text{ where } c_1 > 0, c_2 > 0 \text{ and}$$

c_0 is the minimum amount of cash that must be held; c_1 is the increase in money demanded per unit increase in income and c_2 is the decrease in money demanded per unit increase in the interest rate. Assuming linearity (that is a straight line) the total demand for money is downward sloping relative to the rate of interest.

1.4.1 Investment

Firms borrow money from households to finance investment projects by issuing stocks and bonds or borrowing from financial institutions. The price they pay for this money is the interest rate. As previously noted Keynes assumed firms had an investment schedule that measured the expected profit rate to be earned from alternative projects mapped against the rate of interest. If the expected profit less the cost of money was positive, a firm *ceterus paribus* will undertake the project; if negative, then the project would not be undertaken.

'If the interest rises, then business borrowing declines; if interest falls, borrowing increases. If investment increases then aggregate expenditure shifts up by the autonomous increase in I. This increase through the aggregate expenditure multiplier will lead to an even larger increase in income. Accordingly, the interest sensitivity of aggregate demand is important in determining appropriate monetary policies.

1.4.2 Theory of the Interest Rate

In effect the interest rate is determined in two distinct markets. The first is the market for bonds. The second is the market for money itself. Put another way, one can hold one's wealth (assets) as either money or bonds, i.e.,

$$W_h = B + M$$

At a given rate of interest there will be a demand for money and a supply of money provided by the central bank and an equilibrium value for R that matches the demand and supply of money. Alternatively there is a demand for and a supply of bonds

and an equilibrium value for r that balances supply and demand. In overall equilibrium the resulting interest rate will be the same.

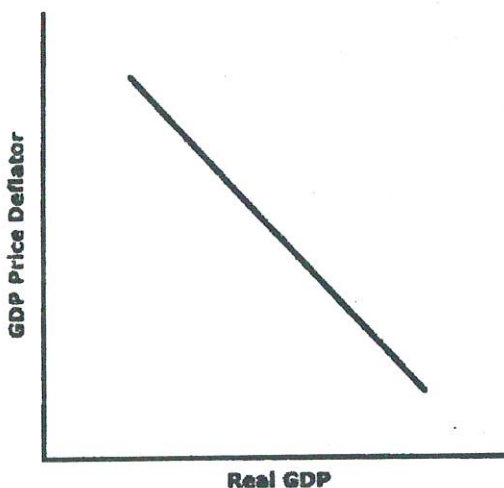
1.5 MONEY SUPPLY AND AGGREGATE DEMAND DETERMINANT

One of several specific aggregate demand determinants assumed constant when the aggregate demand curve is constructed, and that shifts the aggregate demand curve when it changes. An increase in the money supply causes an increase (rightward shift) of the aggregate curve. A decrease in the money supply causes a decrease (leftward shift) of the aggregate curve. Other notable aggregate demand determinants include interest rates, inflationary expectations, and the federal deficit.

A key function of the Federal government is controlling the total amount of money circulating about the economy. Money is what the public uses to buy real production and to undertake the four aggregate expenditures--consumption expenditures, investment expenditures, government purchases, and net exports.

- With more money, aggregate expenditures are greater.
- With less money, aggregate expenditures are lower.

As such, changes in the money supply induce changes in aggregate demand. An increase in the money supply increases aggregate demand and a decrease in the money supply decreases aggregate demand.



Shifting the Curve

Figure 2

Consider a regular, run-of-the-mill aggregate demand curve such as the one displayed here. Like all aggregate demand curves, this one is constructed based on several ceteris paribus aggregate demand determinants, such as the size of the money supply. The key question is: What happens to the aggregate demand curve if the money supply changes?

More Money

Suppose, for example, that the Federal Reserve System decides to undertake expansionary monetary policy. Fearing an impending recession on the business-cycle horizon, it decides to expand the money supply. With extra money circulating about the economy, the purchasing power of all four sectors--household, business, government, and foreign--is enhanced. Everyone is willing and able to buy more real production--at the existing price level. Consumption expenditures, investment expenditures, government purchases, even net exports, all increase, resulting in an increase in aggregate demand.

To see how an increase in the money supply affects the aggregate demand curve, click the [More Money] button. The boost in the money supply triggers an increase in aggregate demand, which is a rightward shift of the aggregate demand curve.

Less Money

Alternatively, the Federal Reserve System could decide to implement contractionary monetary policy. Fearing the onset of higher inflation, the "Fed" might decide to reduce the money supply. With less money circulating about the economy, the purchasing power of all four sectors--household, business, government, and foreign--is restricted. Everyone is willing and able to buy less real production--at the existing price level. Consumption expenditures, investment expenditures, government purchases, even net exports, all decrease, resulting in a decrease in aggregate demand.

To see how a decrease in the money supply affects the aggregate demand curve, click the [Less Money] button. The drop in the money supply triggers a decrease in aggregate demand, which is a leftward shift of the aggregate demand curve

What Does It Mean?

The importance of the money supply as an aggregate demand determinant is critical to the study of macroeconomics, especially monetary policy designed to stabilize business cycles. A frequently recommended, and often pursued, solution to business-cycle contractions is expansionary monetary policy, an increase in the money supply. Alternatively, a solution to business-cycle expansions that causes inflation is contractionary monetary policy, a decrease in the money supply.

When these policies are implemented, the aggregate demand curve shifts, which then induces changes in production, unemployment, and the price level.

Changes

Do not confuse changes in the money supply, as an aggregate demand determinant, with the real-balance effect. While both involve the money supply, they are distinct phenomena. The real-balance effect occurs because changes in the price level cause changes in aggregate expenditures and movements along the aggregate demand curve. The real-balance effect operates because A CHANGE IN THE PRICE LEVEL causes a change the purchasing power of A GIVEN MONEY SUPPLY.

By way of contrast, money supply as an aggregate demand determinant causes changes in aggregate demand and shifts of the aggregate demand curve. This determinant operates because of a change in the money supply. In comparison with the real-balance effect, the aggregate demand curves shifts because A CHANGE IN THE MONEY SUPPLY causes a change in purchasing power at A GIVEN PRICE LEVEL.

1.6 IS/LM MODEL

The IS/LM model is a macroeconomic tool that demonstrates the relationship between interest rates and real output in the goods and services market and the money market. The intersection of the IS and LM curves is the "General Equilibrium" where there is simultaneous equilibrium in all the markets of the economy. IS/LM stands for Investment Saving / Liquidity preference Money supply.

The IS/LM model was born at the Econometric Conference held in Oxford during September, 1936. Roy Harrod, John R. Hicks, and James Meade all presented papers describing mathematical models attempting to summarize John Maynard Keynes'

General Theory of Employment, Interest, and Money. Hicks, who had seen a draft of Harrod's paper, invented the IS/LM model (originally using LL, not LM). He later presented it in "Mr. Keynes and the Classics: A Suggested Interpretation".

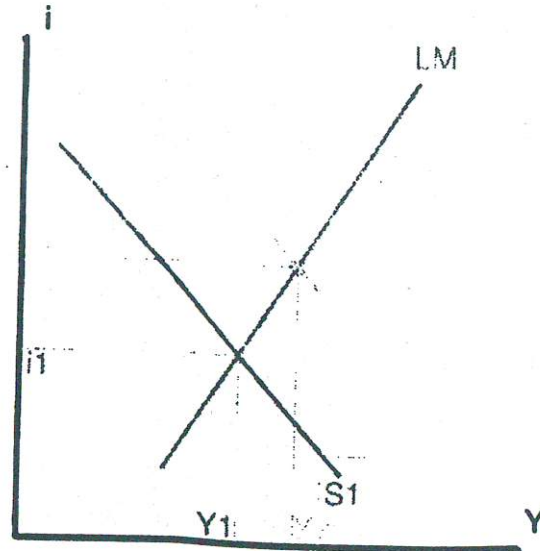


Figure 3. The IS curve moves to the right, causing higher interest rates (i) and expansion in the "real" economy (real GDP, or Y).

Hicks later agreed that the model missed important points from the Keynesian theory, criticizing it as having very limited use beyond "a classroom gadget", and criticizing equilibrium methods generally: "When one turns to questions of policy, looking towards the future instead of the past, the use of equilibrium methods is still more suspect." The first problem was that it presents the real and monetary sectors as separate, something Keynes attempted to transcend. In addition, an equilibrium model ignores uncertainty – and that liquidity preference only makes sense in the presence of uncertainty "For there is no sense in liquidity, unless expectations are uncertain." A shift in the IS or LM curve will cause change in expectations, causing the other curve to shift. Most modern macroeconomists see the IS/LM model as being at best a first approximation for understanding the real world.

Although disputed in some circles and accepted to be imperfect, the model is widely used and seen as useful in gaining an understanding of macroeconomic theory. It is used in most college macroeconomics textbooks.

1.6.1 Formulation

The model is presented as a graph of two intersecting lines in the first quadrant.

The horizontal axis represents national income or real gross domestic product and is labelled Y . The vertical axis represents the nominal interest rate, i .

The point where these schedules intersect represents a short-run equilibrium in the real and monetary sectors (though not necessarily in other sectors, such as labor markets): both product markets and money markets are in equilibrium. This equilibrium yields a unique combination of interest rates and real GDP.

1.6.2 IS schedule

The IS schedule is drawn as a downward-sloping curve with interest rates as a function of GDP (Y). The initials IS stand for "Investment and Saving equilibrium" but since 1937 have been used to represent the locus of all equilibria where total spending (consumer spending + planned private investment + government purchases + net exports) equals an economy's total output (equivalent to real income, Y , or GDP). To keep the link with the historical meaning, the IS curve can represent the equilibria where total private investment equals total saving, where the latter equals consumer saving *plus* government saving (the budget surplus) *plus* foreign saving (the trade surplus). Either way, in equilibrium, all spending is desired or planned; there is no unplanned inventory accumulation (i.e., no general glut of goods and services). The level of real GDP (Y) is determined along this line for each interest rate.

Thus the IS schedule is a locus of points of equilibrium in the "real" (non-financial) economy. Given expectations about returns on fixed investment, every level of interest rate (i) will generate a certain level of planned fixed investment and other interest-sensitive spending: lower interest rates encourage higher fixed investment and the like. Income is at the equilibrium level for a given interest rate when the saving that consumers choose to do, out of this income equals investment (or, more generally, when "leakages" from the circular flow equal "injections"). A higher level of income is needed to generate a higher level of saving (or leakages) at a given interest rate. Alternatively, the multiplier effect of an increase in fixed investment raises real GDP. Both ways explain the downward slope of the IS schedule. In sum, this line represents the line of causation from falling interest rates to rising planned fixed investment (etc.) to rising national income and output.

In a closed economy, the IS curve is defined as: $Y = C(Y - T) + I(r) + G$, where Y represents income, $C(Y - T)$ represents consumer spending as a function of disposable income (income, Y, minus taxes, T), $I(r)$ represents investment as a function of the real interest rate, and G represents government spending. In this equation, the level of G (government spending) and T (taxes) are presumed to be exogenous, meaning that they are taken as a given. To adapt this model to an open economy, a term for net exports (exports, X, minus imports, M) would need to be added to the IS equation. An economy with more imports than exports would have a negative net exports number.

1.6.3 LM Schedule

The LM schedule is an upward-sloping curve representing the role of finance and money. The initials LM stand for "Liquidity preference and Money supply equilibrium". As such, the LM function is the equilibrium point between the liquidity preference or Demand for Money function and the money supply function (as determined by banks and central banks).

The liquidity preference function is simply the willingness to hold cash balances instead of securities. For this function, the interest rate (the vertical) is plotted against the quantity of cash balances (or liquidity, on the horizontal). The liquidity preference function is downward sloping. Two basic elements determine the quantity of cash balances demanded (liquidity preference) - and therefore the position and slope of the function:

- 1) Transactions demand for money: this includes both a) the willingness to hold cash for everyday transactions as well as b) as a precautionary measure - in case of emergencies. Transactions demand is positively related to real GDP (represented by Y). This is simply explained - as GDP increases, so does spending and therefore transactions. As GDP is considered exogenous to the liquidity preference function, changes in GDP shift the curve. For example, an increase in GDP will, ceteris paribus (all else equal), move the entire liquidity function rightward in proportion to the GDP increase.
- 2) Speculative demand for money: this is the willingness to hold cash as an asset for speculative purposes. Speculative demand is inversely related to the interest rate. As the interest rate rises, the opportunity cost of holding cash increases - the

incentive will be to move into securities. As will expectations based on current interest rate trends contributes to the inverse relationship. As the interest rate rises above its historical value, the expectation is for the interest rate to drop. Thus the incentive is to move out of securities and into cash.

The money supply function for this situation is plotted on the same graph as the liquidity preference function. Money supply is determined by the central bank decisions and willingness of commercial banks to loan money. Though the money supply is related indirectly to interest rates, in the short run, money supply in effect is perfectly inelastic with respect to nominal interest rates. Thus the money supply function is represented as a vertical line - it is a constant, independent of the interest rate GDP and other factors. Mathematically, the LM curve is defined as $M/P = L(r, Y)$, where the supply of money is represented as the real money balance M/P (as opposed to the nominal balance M), with P representing the price level, equals the demand for money L , which is some function of the interest rate and the level of income.

Holding all variables constant, the intersection point between the liquidity preference and money supply functions constitute a single point on the LM curve. Recalling that for the LM curve, interest rate is plotted against the real GDP whereas the liquidity preference and money supply functions plot interest rates against quantity of cash balances), that an increase in GDP shifts the liquidity preference function rightward and that the money supply is constant, independent of GDP - the shape of the LM function becomes clear. As GDP increases, the negatively sloped IS preference function shifts rightward. Money supply, and therefore cash balances, is constant and thus, the interest rate increases. It is easy to see therefore, that the LM function is positively sloped.

1.6.4 LM derivation

Let us start with the expression for money supply (M_s) and money demand (M_d).

$$4.2 \quad M_s = M^*/P^*$$

$$4.3 \quad M_d = kY - h_i$$

Expression 4.2 says that the money supply (M_s) is exogenous and though shown in nominal terms, the general price level is assumed to be fixed (P^*). Expression 4.3 says

that money demand is positive function of Y (transactions) and negative function of the interest rate.

What does $Md = kY$ mean? It means that the higher our level of income, the more money we want in our pocket (or equivalently our debit card) to finance our everyday purchases of goods and services; is our "transactions demand". Equally what does $Md = -hi$ mean? It means that the higher the rate of interest, the higher is the opportunity cost of "being liquid"; ie, holding cash as opposed to yield-bearing securities.

1.6.4 Shifts

One hypothesis is that a government's deficit spending ("fiscal policy") has an effect similar to that of a lower saving rate or increased private fixed investment, increasing the amount of aggregate demand for national income at each individual interest rate. An increased deficit by the national government shifts the IS curve to the right. This raises the equilibrium interest rate (from i_1 to i_2) and national income (from Y_1 to Y_2), as shown in the graph above.

From the point of view of quantity theory of money, fiscal actions that leave the money supply unchanged can only shift aggregate demand if they receive support from the monetary sector. In this case, the velocity or demand of money determines aggregate demand. If the velocity of money remains unchanged at the initial level of output, so does aggregate demand. Essentially, the monetary sector is the source of any shift that occurs. From the monetarist perspective, money velocity is stable, but, from a Keynesian point of view, an increase in aggregate demand can increase the velocity of money and lead to higher output.

The graph indicates one of the major criticisms of deficit spending as a way to stimulate the economy: rising interest rates lead to crowding out – i.e., discouragement – of private fixed investment, which in turn may hurt long-term growth of the supply side (potential output). Keynesians respond that deficit spending may actually "crowd in" (encourage) private fixed investment via the accelerator effect, which helps long-term growth. Further, if government deficits are spent on productive public investment (e.g., infrastructure or public health) that directly and eventually raises potential output, although not necessarily as much as the lost private investment might have. Whether a stimulus crowds out or in depends on the shape of the LM curve. A shift in the IS curve

along a relatively flat LM curve can increase output substantially with little change in the interest rate. On the other hand, an upward shift in the IS curve along a vertical LM curve will lead to higher interest rates, but no change in output (This case represents the Treasury View).

The IS/LM model also allows for the role of monetary policy. If the money supply is increased, that shifts the LM curve to the right, lowering interest rates and raising equilibrium national income.

Usually the model is used to study the short run when prices are fixed or sticky and no inflation is taken into consideration. To include these and other crucial issues, several further diagrams are needed or the equations behind the curves need to be modified.

Activity 1

1. Discuss in detail the quantity theory approach.
2. What do you understand by Cambridge cash balance theory? How it is different from Fisher's approach?
3. Explain briefly liquidity preference and aggregate demand for money.
4. Write a detailed note on ISLM model and its applications.

1.7 SUMMARY

The unit started from the introduction to theories and approaches to money. Various factors related to quantity theory of money were discussed in the later section. Followed by this, Liquidity preference in macroeconomic theory referred to the demand for money, considered as liquidity. Various sorts of demands for money were the next concern. Transaction demand, precautionary demand; speculative demand; total demand were discussed in detail. Money supply and aggregate demand determinants have been explained with suitable examples. Finally ISLM model, its implications, and derivations along with shifts were dealt in detail.

1.8 FURTHER READINGS

- Friedman, Milton (1987 [2008]). "quantity theory of money", The New Palgrave: A Dictionary of Economics
- Ludwig Heinrich Edler von; Human Action: A Treatise on Economics (1949), Ch. XVII "Indirect Exchange", §4. "The Determination of the Purchasing Power of Money".
- Robert J. Gordon, Macroeconomics eleventh edition, 2009
- Hicks, J. R. (1937), "Mr. Keynes and the Classics - A Suggested Interpretation", *Econometrica*, v. 5 (April): 147-159.
- Hicks, John (1980-1981), "IS-LM: An Explanation", *Journal of Post Keynesian Economics*,

UNIT 2

POST KEYNESIAN APPROACHES TO DEMAND FOR MONEY

Objectives

After reading this unit, you should be able to:

- Understand the Patinkin's real balance effect.
- Know the Baumol and Tobin's model
- Appreciate Friedman's modern theory
- Know the crisis in Keynesianism, its aftermath and revival.

Structure

- 2.1 Introduction
- 2.2 Patinkin's real balance effect
- 2.3 Baumol and Tobin's model
- 2.4 Friedman and the modern quantity theory
- 2.5 Crisis in Keynesianism
- 2.6 The Keynesianism revival
- 2.7 Summary
- 2.8 Further readings

2.1 INTRODUCTION

Over the last two decades, work on the Post Keynesian theory of endogenous money has been flourishing, and has prompted a rethinking of the complex nature of money in modern economies. In this unit we are going to discuss some of the main post Keynesian approaches to demand for money.

2.2 PATINKIN AND THE REAL BALANCE EFFECT

Don Patinkin was born in Chicago on January 8, 1922, to Russian Jewish immigrants, and he died in Jerusalem on August 6, 1995. His main contribution was the integration of the theories of value and money developed in *Money, Interest, and Prices*, the most influential book on monetary macroeconomics in the 1950s and 1960s. That book grew out of Patinkin's PhD thesis, submitted to the University of Chicago in 1947 after an academic year as research assistant at the Cowles Commission for Economic Research, where he interacted with well-known economists such as Lawrence Klein, Kenneth Arrow, Trygve Haavelmo, and Jacob Marschak, among others. In 1949, after a brief period as assistant and associate professor at the Universities of Chicago (1947–1948) and Illinois (1948–1949) respectively, Patinkin moved to Israel to take up a position as lecturer in the newly created department of economics at the Hebrew University, where he stayed until the end of his life. Apart from his academic appointments at the university (as full professor after 1957 and emeritus after 1989), Patinkin also served as the first director of the Maurice Falk Institute for Economic Research in Israel from 1956 to 1972.

2.2.1 The Real Balance Effect

Patinkin's 1956 book may be regarded as the most important contribution to the neo-Walrasian synthesis (named after French economist Léon Walras)—that is, the attempt to build the theoretical framework of macroeconomics on a developed general equilibrium system—after John Hicks's 1939 *Value and Capital*. The process of adjustment to equilibrium was firmly grounded by Patinkin on the “method of successive approximation,” Walras's theory of *tatonnement*, which had been largely neglected in the literature. Together with Paul A. Samuelson's stability analysis, the *tatonnement* provided the backbone of Patinkin's discussion of how the market solves the excess-demand equations. He criticized traditional “classical” monetary analysis for assuming that the equations of excess demand for goods determine relative prices (called the “homogeneity postulate”), while the price level is determined by the equation of exchange in the market for money. Partly motivated by the work of his former Chicago teacher Oskar Lange, Patinkin showed that this “dichotomization” of the economy into

real and monetary sectors was logically inconsistent. In particular he was the first to realize that if the demand for money depended on the price level then—because of the budget constraint of agents—the demand for goods also depended on that level. Logical consistency required that the equations of excess demand for goods include real money balances as an argument in the individual utility functions, named “real balance effect” by Patinkin. The invalid dichotomization described above should be, according to Patinkin, distinguished from the “valid dichotomy” between the real and monetary sectors, expressed by the quantity theory of money as formulated in his book: Under the assumption the agents are free of money illusion, changes in the quantity of money affect only nominal variables and leave the equilibrium value of real variables unaffected (i.e., money is neutral in the long-run).

Although the stabilizing effect of changes in the price level on real balances and, therefore, on aggregate demand had been discussed before, specifically by Gottfried Haberler in his 1937 book *Prosperity and Depression* and by A. C. Pigou in his 1943 article “The Classical Stationary State,” they did not work out its implications for the integration of monetary and value theory. According to Harry G. Johnson in his 1962 article “Monetary Theory and Policy,” Patinkin’s criticism of classical monetary theory sparked off a debate about the accuracy of his historical account and the import of his theoretical claims, known as “the Patinkin controversy.” A few years later, Frank Hahn argued in his 1965 article “On Some Problems of Proving the Existence of an Equilibrium in a Monetary Economy,” that Patinkin left unsolved a fundamental problem of monetary theory: to prove the existence of a general equilibrium with a positive value for money.

Now let’s know some more on real balance effect

A change in aggregate expenditures on real production made by the household, business, government, and foreign sectors that results because a change in the price level alters the purchasing power of money. This is one of three effects underlying the negative slope of the aggregate demand curve associated with a movement along the aggregate demand curve and a change in aggregate expenditures. The other two are interest-rate effect and net-export effect. The real-balance effect is somewhat analogous to the income effect underlying the negative slope of the market demand curve.

The real-balance effect is one of three basic effects that indicate why aggregate expenditures are inversely related to the price level. The real-balance effect works like this: A higher price level decreases the purchasing power of money resulting in a decrease in consumption expenditures, investment expenditures, government purchases, and net exports. A lower price level has the opposite affect, causing an increase in the purchasing power of money which results in an increase in consumption expenditures, investment expenditures, government purchases, and net exports.

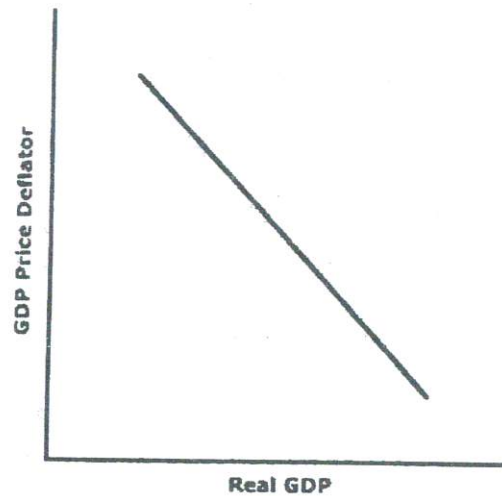


Figure 1 along the Curve

Before examining the details of the real-balanced effect, consider the specifics of what it does. A typical aggregate demand curve is presented in the exhibit to the right. The negative slope of the aggregate demand curve captures the inverse relation between the price level and aggregate expenditures on real production.

When the price level changes, the real-balanced effect is activated, which is what then results in a change in aggregate expenditures and the movement long the aggregate demand curve. To illustrate this process, click the [Change Price Level] button.

The real-balanced effect is based on the realistic presumption that the supply of money in circulation is constant at any given time. Money is what the four basic macroeconomic sectors use to purchase production. How much production they are able to purchase (that is, aggregate expenditures) depends on the amount of money in

circulation relative to the prices of the goods and services produced (that is, the price level). When the price level changes, the purchasing power of the available money supply also changes and so too do aggregate expenditures. A higher price level means money can buy less production. A lower price level means money can buy more production.

Suppose, for example, that Duncan Thurdy's share of the nation's money supply is \$10. At a price of \$2 each, he can afford to purchase five Wacky Willy Stuffed Amigos (those cute and cuddly armadillos and scorpions). However, if the price level rises, and with it the price of Stuffed Amigos, then he can no longer afford to purchase five of these cuddly creatures. At \$2.50 each, he can now afford to buy only four Stuffed Amigos. His share of aggregate expenditures on REAL production declines from five Stuffed Amigos to four. The purchasing power of his \$10 of money has fallen and with it his aggregate expenditures on real production. He has succumbed to the real-balance effect.

How in the world did economists come up with the phrase "real-balance" to indicate this effect? The "real" part refers to the "real" purchasing power of money. That is, how much real production can be purchased with the money. The "balance" part is included because money is often referred to as money "balances." This effect could be called the real-money effect just as easily.

2.2.2 Disequilibrium Macroeconomics

Patinkin's second main theme was the contrast between the Keynesian model (named after British economist John Maynard Keynes)—where markets do not clear and quantities respond to quantities—and the Walrasian system, which assumes that trades are only made at a market-clearing price vector. According to Patinkin, unemployment is a disequilibrium phenomenon that should be understood as the result of the effect of aggregate demand constraint on the behavior of firms and workers. Patinkin's disequilibrium analysis of the labor market, with both firms and workers off their respective labor demand and labor supply curves, was later complemented by Robert W. Clower's analogous interpretation of consumption as a function of income in the goods market in his 1965 publication "The Keynesian Counter-Revolution: A Theoretical Appraisal." In their 1971 article "A General Disequilibrium Model of Income and Employment," Robert J. Barro and Herschel I. Grossman combined Patinkin's and Clower's analyses in a fixed-price model that quickly became the most influential

exposition of disequilibrium macroeconomics. It was largely thanks to the Barro-Grossman model—which may be regarded as an outgrowth of chapter 13 of *Money, Interest, and Prices* — that Patinkin's approach to unemployment finally penetrated the macroeconomic literature. After this theoretical contribution to Keynesian economics, Patinkin became engaged in the 1970s and 1980s in an extensive investigation of the historical development of Keynes's thought. He concluded that the "central message" of Keynes's macroeconomics was the role of changes in aggregate income in bringing the goods market to less than full employment equilibrium, based on the assumption that the marginal propensity to consume is less than one.

2.2.3 Classical dichotomy

The classical dichotomy theory refers to the division between real and nominal variables in economics. Real variables such as output, unemployment, or real interest rates do not necessarily have to be influenced by changes in nominal variables, as most importantly the nominal money supply. Changes in the money supply therefore do not - according to the strict dichotomy - influence real variables (monetary neutrality). The classical dichotomy was central to the thinking of early economists (money as a veil).

Patinkin (1954) challenged the classical dichotomy as being inconsistent, with the introduction of the 'Real balance effect' of changes in the nominal money supply. The early classical writers postulated that money is inherently equivalent in value to that quantity of real goods which it can purchase. Therefore, in Walrasian terms, a monetary expansion would raise prices by an equivalent amount, with no real effects (employment, growth). Patinkin postulated that this inflation could not come about without a corresponding disturbance in the goods market, through the 'real balance effect'. As the money supply is increased, the real stock of money balances exceeds the 'ideal' level, and thus expenditure on goods is increased to re-establish the optimum balance. This raises the price level in the goods market, until the excess demand is satisfied, at the new equilibrium. He thus argued that the classical dichotomy was inconsistent, in that it did not explicitly allow for this adjustment in the goods market - the price adjustment was assumed to be immediate - the 'invisible hand'.

Later writers (Archibald & Lipsey, 1958) argued that the dichotomy was perfectly consistent, as it did not attempt to deal with the 'dynamic' adjustment process, it merely stated the 'static' initial and final equilibria.

Mathematical properties

A classical dichotomy is exhibited when the jacobian matrix of the series equations $Jdy = dx$ is block recursive in nature. In other words, you should be able to solve for all real variables without having to solve for money.

2.2.4 Patinkin's Impact

Patinkin's search for the micro foundations of macroeconomics has had a deep impact on economic theory. His contribution to the money-in-the-utility-function approach has become part of modern monetary theory mainly through the work of Miguel Sidrauski (1967). Although the real balance effect has lost space to substitution effects in monetary economics—its acceptance nowadays depends on the theoretical assumption that the inter temporal utility function is not separable in consumption and money balances, and on the empirical evidence about its size at business-cycle frequencies—according to Richard J. Sweeney (1988) and Peter N. Ireland (2005) it still plays a role as part of the broader wealth effect in models with specified inter temporal budget constraints and forward looking agents. In the same vein, despite the diminishing interest on disequilibrium macroeconomics since the late 1970s, Patinkin's path breaking search for the compatibility of macroeconomics and microeconomics has left its mark on the research agenda of Keynesian and neoclassical economists alike.

2.3 BAUMOL AND TOBIN MODEL

The Baumol-Tobin model is an economic model of the transactions demand for money as developed independently by William Baumol (1952) and James Tobin (1956). The theory relies on the trade off between the liquidity provided by holding money (the ability to carry out transactions) and the interest foregone by holding one's assets in the form of non-interest bearing money. The key variables of the demand for money are then the nominal interest rate, the level of real income which corresponds to the amount of desired transactions and to a fixed cost of transferring one's wealth between liquid money

and interest bearing assets. The model was originally developed in order to provide micro foundations for aggregate money demand functions commonly used in Keynesian and Monetarist macroeconomic models of the time. Later on, the model was extended to a general equilibrium setting by Boyan Jovanovic (1982) and David Romer (1986).

2.3.1 Formal exposition of the model

Suppose an individual receives her paycheck of Y dollars at the beginning of each period and subsequently spends it at an even rate over the whole period. In order to spend the income she needs to hold some portion of Y in the form of money balances which can be used to carry out the transactions. Alternatively, she can deposit some portion of her income in an interest bearing bank account or in short term bonds. Withdrawing money from the bank, or converting from bonds to money, incurs a fixed transaction cost equal to C per transfer (which is independent of the amount withdrawn). Let N denote the number of withdrawals made during the period and assume merely for the sake of convenience that the initial withdrawal of money also incurs this cost. Money held at the bank pays a nominal interest rate, i , which is received at the end of the period. For simplicity, it is also assumed that the individual spends her entire paycheck over the course of the period (there is no saving from period to period).

As a result the total cost of money management is equal to the cost of withdrawals, NC , plus the interest foregone due to holdings of money balances, iM , where M is the average amount held as money during the period. Efficient money management requires that the individual minimizes this cost, given her level of desired transactions, the nominal interest rate and the cost of transferring from interest accounts back to money.

The average holdings of money during the period depend on the number of withdrawals made. Suppose that all income is withdrawn at the beginning ($N=1$) and spent over the entire period. In that case the individual starts with money holdings equal to Y and ends the period with money holdings of zero. Normalizing the length of the period to 1, average money holdings are equal to $Y/2$. If an individual initially withdraws half her income, $Y/2$, spends it, then in the middle of the period goes back to the bank and withdraws the rest she has made two withdrawals ($N=2$) and her average money

holdings are equal to $Y/4$. In general, the person's average money holdings will equal $Y/2N$.

This means that the total cost of money management is equal to:

$$NC + \frac{Yi}{2N}$$

The minimum number of withdrawals can be found by taking the derivative of this expression with respect to N and setting it equal to zero (note that the second derivative is positive, which ensures that this is a minimum, not a maximum).

The condition for minimum is then given by:

$$C - \frac{Yi}{2N^2} = 0$$

Solving this for N we get the optimal number of withdrawals:

$$N^* = \left(\frac{Yi}{2C}\right)^{\frac{1}{2}}$$

Using the fact that average money holdings are equal to $Y/2N$ we obtain a demand for money function:

$$M = \left(\frac{CY}{2i}\right)^{\frac{1}{2}}$$

The model can be easily modified to incorporate an average price level which turns the money demand function into a demand for liquidity function:

$$L(Y, i) = \frac{M}{P} = \left(\frac{CY}{2i}\right)^{\frac{1}{2}}$$

2.4 FRIEDMAN AND THE MODERN QUANTITY THEORY

The quantity theory of money, dating back at least to the mid-sixteenth-century Spanish Scholastic writers of the Salamanca School, is one of the oldest theories in economics. Modern students know it as the proposition stating that an exogenously given one-time change in the stock of money has no lasting effect on real variables but leads ultimately to a proportionate change in the money price of goods. More simply, it declares that, all else being equal, money's value or purchasing power varies inversely with its quantity.

There is nothing mysterious about the quantity theory. Classical and neoclassical economists never tired of stressing that it is but an application of the ordinary theory of demand and supply to money. Demand-and-supply theory, of course, predicts that a good's equilibrium value, or market price, will fall as the good becomes more abundant relative to the demand for it. In the same way, the quantity theory predicts that an increase in the nominal supply of money will, given the real demand for it, lower the value of each unit of money in terms of the goods it commands. Since the inverse of the general price level measures money's value in terms of goods, general prices must rise.

In the late nineteenth and early twentieth centuries, two versions of the theory competed. One, advanced by the American economist Irving Fisher (1867-1947), treated the theory as a complete and self-contained explanation of the price level. The other, propounded by the Swedish economist Knut Wicksell (1851-1926), saw it as part of a broader model in which the difference, or spread, between market and natural rates of interest jointly determine bank money and price level changes.

The contrasts between the two approaches were striking. Fisher's version was consistently quantity theoretic throughout and indeed focused explicitly on the received classical propositions of neutrality, equiproportionality, money-to-price causality, and independence of money supply and demand. By contrast, Wicksell's version contained certain elements seemingly at odds with the theory. These included (1) a real shock explanation of monetary and price movements, (2) the complete absence of money (currency) in the hypothetical extreme case of a pure credit economy, and (3) the identity between deposit supply and demand at all price levels in that same pure credit case rendering prices indeterminate.

Although the quantity theory has had a long history, it fell into disrepute in the 1930s, in part because it seemed at the time that this theory could not explain the Great Depression, and partly because of the publication in 1936 of Keynes theory. Although some economists continued to advocate the quantity theory, most economists became Keynesians and treated the quantity theory as a historical curiosity.

Only in the mid- and late-1950s did the quantity theory again become a serious rival to the Keynesian theory. There were several reasons for the revival. One was that, contrary, to the prediction of many Keynesians, upon the conclusion of World War II the

American economy did not revert to the depressed conditions of the 1930s, but instead underwent inflation. Second, one seemingly great benefit of the Keynesian revolution had been its demonstration that by manipulating expenditures and taxes, the government can keep the economy close to full employment. But it turned out that there were serious political as well as economic difficulties in actually changing government expenditures and tax rates in these recommended ways, and that Keynesian theory appeared to be less useful than it had originally seemed.

However the resurgence of the quantity theory should not be attributed merely to impersonal historical events. It is also due to the fact that several extremely able economists advocated this theory. Don Patinkin of Hebrew University restated the quantity theory in a rigorous way that avoids many of the crudities that infested earlier expositions. Milton Friedman, of the University of Chicago, and many of his former students provided a framework that allow one to test empirically the proposition that changes in the quantity of money dominate changes in income. Moreover Friedman and Anna Schwartz of the National Bureau of Economic Research argued in a lengthy study that the experience of the Great Depression should be interpreted as confirming the prediction of the quantity theory rather than that of Keynesian theory. Subsequently they showed that in both the United States and Britain, longer run movements in nominal income were highly correlated with movements in the money stock.

Despite the resurgence of the Quantity Theory in the 1970s and early 1980s it is still far from universally accepted by economists. Controversies about its validity and applicability rage on. In his masterful 1991 survey, David Laidler noted that:

Controversy about the Quantity Theory has been marked by common themes since the 18th century. These include the definition of money, the relationship between correlation and causation, and the transmission mechanism. Controversy has continued because of the technical difficulty of sorting out the direction of causation running between money and prices, and, on a deeper level, because ideological concerns about the viability of market mechanisms are at stake in the controversy.

2.5 CRISIS IN KEYNESIAN

Starting in 2008, there has been a resurgence of interest in Keynesian economics among various policy makers from the world's industrialized economies. This has included discussions and implementation of some economic policies in accordance with the recommendations made by John Maynard Keynes in response to the Great Depression—such as fiscal stimulus and expansionary monetary policy.

From the end of the Great Depression until the early 1970s, Keynesian economics provided the main inspiration for economic policy makers in western industrialized countries. The influence of Keynes's theories waned in the 1970s, due to stagflation and critiques from Milton Friedman, Robert Lucas, Jr., Friedrich Hayek and other economists who were less optimistic about the ability of interventionist government policy to positively regulate the economy. The advent of the global financial crisis in 2008 prompted a resurgence of interest in Keynesian economics among policy makers. Paralleling this change, there has also been some rethinking of the relevance of Keynes' ideas among academics; however, the revival of Keynesian economics in academia has been more controversial and muted.

2.5.1 Competing views on macroeconomic policy

Macroeconomic policy focuses on high level government decisions which affect overall national economies rather than lower level decisions concerning markets for particular goods and services. The Keynesian resurgence can be understood in the context of various competing perspectives from which policy recommendations originate. A key issue of contention is the optimal level of government intervention in economic affairs. For an overview on the different perspectives, see Liberal, Realist & Marxist. For more detail on specific systems of thought relevant to debate on this fiscal policy see Keynesian economics, Monetarism, Austrianism, New Classical economics, Real business cycle theory, and New Keynesian economics.

Over the last sixty years, most strikingly in the Anglo American economies but to a large extent worldwide, the two competing views receiving the most attention at policy-making level have been Keynesianism and Monetarism.

Monetarists advise minimal government intervention in the economy, apart from tightly controlling the money supply and publicizing targets for future modest expansion, thus setting expectations so as to reduce inflation. Monetarists also tend to favor free market policies such as clamping down on powerful labor unions, fairly light regulation, and generally small government – although not typically to the extremes favoured by other economic liberals such as Austrian school economists and Libertarians.

Keynesians, in contrast to Monetarists, tend to place greater importance on the role of fiscal policy over monetary policy in the ups and downs of the economic cycle; they advise government intervention, especially in a recession where the standard recommendation is for increased government spending - especially on capital projects such as infrastructure - and tax reductions in order to stimulate aggregate demand. In a boom they often suggest measures to dampen demand such as raising taxes and interest rates, and throughout the business cycle they prefer regulation of economic activity.

Keynesian Economics evolved from the Keynesian Revolution. In contrast to the recent resurgence of Keynesian policy making the revolution initially comprised a shift change in theory. There had been several experiments in policy making that can be seen as precursors for Keynes ideas, most notably Franklin D. Roosevelt's famous "New Deal" (Roosevelt was US president from 1933 to 1945). These experiments however had been influenced more by morals, geopolitics and political ideology than by new developments in economics, although it is notable that Keynes had found some support in the US for his ideas about counter-cyclical public-works policy as early as 1931. According to Gordon Fletcher, Keynes' General Theory provided a conceptual justification for 'New Deal'-type policies which was lacking in the established economics of the day - immensely significant as in the absence of a proper theoretical underpinning there was a danger that ad hoc policies of moderate intervention would be overtaken by extremist solutions, as had already happened in much of Europe. Keynes did not however agree with all aspects of the New Deal; he considered that the almost immediate revival of business activity after the program's launch could only be accounted for by psychological factors, which are dangerous to rely on, such as the boost to confidence by Roosevelt's inspiring oratory.

Since the 1940s the influence of Keynesian Economics on government policy makers has both waxed and waned under pressure from free market economics, and from late 2008 appears to be waxing once again.

2.5.2 The Keynesian ascendancy: 1941–1979

While working on his General Theory, Keynes wrote to George Bernard Shaw saying "I believe myself to be writing a book on economic theory which will largely revolutionize, not I suppose at once but in the course of the next ten years – the way the world thinks about economic problems ... I don't merely hope what I say, in my own mind I'm quite sure". Professor Keith Shaw wrote that this degree of self confidence was quite amazing especially considering it took more than fifty years for the Newtonian revolution to gain universal recognition; but also that Keynes's confidence was fully justified. Keynes provided the main inspiration for European and American economic policy makers from about 1941–1979. The fifties and sixties, where Keynes's influence was at its peak, has been described as appearing in retrospect to have been a golden age. In late 1965 *Time* magazine ran a cover article with the title inspired by Milton Friedman's statement, later associated with Nixon, that "We Are All Keynesians Now". The article described the exceptionally favourable economic conditions then prevailing, and reported that "Washington's economic managers scaled these heights by their adherence to Keynes's central theme: the modern capitalist economy does not automatically work at top efficiency, but can be raised to that level by the intervention and influence of the government." The article also states that Keynes was one of the three most important economists ever, and that his *General Theory* was more influential than the magna opera of his rivals - Smith's The Wealth of Nations and Marx's Das Kapital.

2.5.3 Displacement by monetarism: 1979–1984

The stagflation of the 1970s, including Richard Nixon's imposition of wage and price controls on August 15, 1971 and in 1972 unilaterally canceling the Bretton Woods system and ceasing the direct convertibility of the United States dollar to gold, as well as the 1973 oil crisis and the recession that followed, unleashed a swelling tide of criticism for Keynesian economics, most notably from Milton Friedman, a leading figure of Monetarism, and the Austrian School's Friedrich von Hayek. In 1976, Robert Lucas of the Chicago school of economics introduced the Lucas critique, which called into

question the logic behind Keynesian macroeconomic policy making. By 1979, the election of Margaret Thatcher as UK prime minister brought monetarism to British economic policy. In the US, the Federal Reserve under Paul Volker adopted similar policies of monetary tightening in order to squeeze inflation out of the system.

The monetarist experiments in the UK in the early 1980s succeeded in bringing down inflation, but at the cost of unemployment rates in excess of 10%. Contrary to monetarist predictions, the relationship between the money supply and the price level proved unreliable in the short- to medium-term. The US Federal Reserve officially discarded monetarism in 1984 and the Bank of England likewise abandoned its sterling M3 money targeting in October 1985.

The early 90s saw some instances of fiscal intervention by policymakers in the US and UK, and such Keynesian remedies were never wholly dropped in Europe and other parts of the world. This period has been described as a time of pragmatism, when, rather than following any one economic doctrine, policymakers chose whatever solution seemed to suit the particular circumstances they faced best. Yet free-market influences broadly sympathetic to Monetarism remained very strong at government level in powerful normative institutions like the World Bank, IMF and US Treasury, and in prominent opinion-forming media such as the Financial Times and the Economist.

2.6 THE KEYNESIAN REVIVAL

In the wake of the +6financial crisis of 2007–2010 the free market consensus began to attract negative comment even by mainstream opinion formers from the economic right.

2.6.1 United States and Britain

In March 2008, free-market guru Martin Wolf, chief economics commentator at the Financial Times, announced the death of the dream of global free-market capitalism, and quoted Josef Ackermann, chief executive of Deutsche Bank, as saying "I no longer believe in the market's self-healing power." Shortly afterward economist Robert Shiller began advocating robust government intervention to tackle the financial crisis, specifically citing Keynes. Macro economist James K. Galbraith used the 25th Annual Milton Friedman Distinguished Lecture to launch a sweeping attack against the

consensus for monetarist economics and argued that Keynesian economics were far more relevant for tackling the emerging crises.

A series of major bailouts followed, starting on September 7 with the announcement that the U.S. government was to nationalize the two firms which oversaw most of the U.S. mortgage market—Fannie Mae and Freddie Mac. In October, the British Chancellor of the Exchequer referred to Keynes as he announced plans for substantial fiscal stimuli to head off the worst effects of recession, in accordance with Keynesian economic thought. Similar policies have been announced in other European countries, by the U.S., and by China. This is in stark contrast to the scope given to Indonesia during its financial crisis of 1997, when the IMF forced it to close 16 banks simultaneously, prompting a bank run.

Prominent Keynesian economists included the Nobel Prize winning Paul Krugman, described by the Financial Times as a "radical keynesian economist", along with Robert Reich, Greg Mankiw and Joseph Stiglitz. Mankiw argued that Keynes was the economist who provided the greatest single insight into the crisis, but later encouraged skepticism about a fiscal stimulus.

The works on Keynes of Hyman Minsky, Robert Skidelsky, and Donald Markwell were widely cited. Much discussion reflected Keynes's advocacy of international coordination of fiscal or monetary stimulus, and of international economic institutions such as the International Monetary Fund and World Bank, which he had helped to create at Bretton Woods in 1944, and which many argued should be reformed at a "new Bretton Woods". This was evident at the G20 and APEC meetings in Washington, D.C., and Lima, Peru, in November 2008, and in coordinated reductions of interest rates by many countries in November and December 2008. IMF and United Nations economists and political leaders such as British Prime Minister Gordon Brown advocated a coordinated international approach to fiscal stimulus. The President of the World Bank, Robert Zoellick, advocated that all developed country pledge 0.7 percent of its stimulus package to a vulnerability fund for assisting developing countries. It was argued (e.g. by Donald Markwell) that the absence of an international approach in the spirit of Keynes, or its failure, risked the economic causes of international political conflict which Keynes had identified (e.g. in the 1930s) coming into play again.

In a speech on January 8, 2009, President Barack Obama unveiled a plan for extensive domestic spending to combat recession, further reflecting Keynesian thinking. The plan was signed by the President on February 17, 2009. There had been extensive debate in Congress concerning the necessity, adequacy, and likely effects of the package, which saw it being cut from \$819 to \$787 billion during its passage through the Senate.

A renewed interest in Keynesian ideas was not limited to western countries. In a speech delivered in March 2009 entitled Reform the International Monetary System, Zhou Xiaochuan, the governor of the People's Bank of China revived Keynes's idea of a centrally managed global reserve currency. Dr Zhou argued that it was unfortunate that Keynes's Bancor proposal was not accepted at Bretton Woods in the 1940s. He argued that national currencies were unsuitable for use as global reserve currencies as a result of the Triffin dilemma - the difficulty faced by reserve currency issuers in trying to simultaneously achieve their domestic monetary policy goals and meet other countries' demand for reserve currency. Dr Zhou proposed a gradual move towards adopting IMF Special Drawing Rights (SDRs) as a centrally managed global reserve currency. Dr Zhou's view was echoed in June 2009 by the IMF and in September was described by the Financial Times as the boldest statement of the year to come from China.

In an widely read article on dollar hegemony published in Asia Times On Line on April 11, 2002, Henry C.K. Liu asserts that "The Keynesian starting point is that full employment is the basis of good economics. It is through full employment at fair wages that all other economic inefficiencies can best be handled, through an accommodating monetary policy." Liu has also advocated that Chinese exports be denominated in Chinese currency (RMB) as a step to free China from the constraints of excessive reliance on the dollar.

2.6.2 Effectiveness

China was one of the first nations to launch a substantial fiscal stimulus package, estimated at \$586 billion spread over two years, and in February 2009 the Financial Times reported that both government officials and private investors were seeing signs of recovery, such as rises in commodity prices, a 13% rise in the Chinese stock market over a period of 10 days, and a big increase in lending—reflecting the government's success in using state owned banks to inject liquidity into the real economy.

As late as April, central bankers and finance ministers remained cautious about the overall global economy, but in May 2009 the Financial Times (FT) reported that according to a package of leading indicators there were signs that recovery was now imminent in Europe to, after a trough in March. The US was one of the last major economies to implement a major stimulus plan, and the slowdown there looked set to continue for at least a few more months. There was also a rise in business and consumer confidence across most of Europe, especially in the emerging economies such as Brazil, Russia and India. In June, OECD reported improvements to the global economic outlook, with overall growth now forecast for 2010 instead of a small contraction. OECD specifically credited stimulus plans, which they warned should not be rolled back too swiftly. The IMF also reported a better than expected global economic outlook in July, though warning the recovery is likely to be slow. Again they credited the "unprecedented" global policy response and echoed the OECD in urging leaders to avoid complacency and not to unwind recession fighting fiscal and monetary policy too soon. In a widely syndicated article published in August 2009, Paul Krugman announced that the world had been saved from the threat of a second great depression, thanks to "Big Government". The US economy emerged from recession in the third quarter of 2009, which the FT credited to the stimulus measures. In November managing director of the IMF Dominique Strauss-Kahn again repeated the warning against exiting from the stimulus measures too soon, though the FT reported significant differences have now emerged even within Europe, with senior members of the European Central Bank expressing concern about the risk of delaying the exit for too long. On 8 December 2009, President Obama unveiled what the FT have described as a "second stimulus plan" for additional job creation using approx \$200 billion of unused funds that had been pre-approved for the Troubled Asset Relief Program. The same speech saw the President advise that the initial stimulus had already saved or created 1.6 million jobs. In an article looking back at 2009, economics professor Arvind Subramanian wrote in the FT that economics had helped to redeem itself by providing advice for the policy responses that successfully prevented a global slide into depression, with the fiscal policy stimulus measures taking their "cue from Keynes."

growth and employment levels increased for four successive years as *New Deal* policies were pursued by President Roosevelt. When government spending was cut back in 1937 due to concerns about the budget deficit, all the gains were lost in one year, and growth only resumed after spending increased again from 1938, as a response to growing acceptance of Keynes's ideas and later to the need for war spending. For Davidson, this experience "proves beyond a shadow of a doubt" that Keynesian policy has the power to deliver full employment and prosperity for a government's entire labor force.

On November 8, 2008, Paul Davidson and Henry C.K. Liu co-authored an open letter to world leaders attending the November 15 White House summit on financial markets and the world economy urging reconsideration of John Maynard Keynes' analytical system that contributed to the golden age of the first quarter century after World War II. The letter, signed by many supporting economists, advocates a new international financial architecture based on an updated 21st century version of the Keynes Plan originally proposed at Bretton Woods in 1944.

The letter ends by describing this new international financial architecture as aiming to create (1) a new global monetary regime that operates without currency hegemony, (2) global trade relationships that support rather than retard domestic development and (3) a global economic environment that promotes incentives for each nation to promote full employment and rising wages for its labor force.

2.6.4 Criticism

Keynesian ideas have also attracted considerable criticism. While there has been broad consensus among international leaders concerning the need for co-coordinated stimulus, the German administration initially stood out in their reluctance to wholeheartedly embrace Keynesian policy.

Critics focus on arguing that Keynesian policy will be counter-productive - reasons given include assertions that it will be inflationary, create more income disparity and cause consumers to rein in their spending even more as they anticipate future tax rises. In 2009 more than 300 professional economists, led by three Nobel Laureates in economics - James M. Buchanan, Edward Prescott and Vernon Smith, signed a statement against more government spending arguing that "Lower tax rates and a reduction in the burden of government are the best ways of using fiscal policy to boost growth." Robert

Barro, an economics professor at Harvard University, has argued that stimulus spending may be unwise, claiming one of the factors the US stimulus package depends on for its effectiveness, the multiplier effect is in practice close to zero - not 1.5 as he says the Obama team were assuming- which means the extra employment generated by the stimulus will be cancelled out by less output and investment in the private sector. A group of German economists have also argued that the size of the multiplier effect has been over estimated. Edward Prescott and fellow economist Eugene Fama have also argued that the stimulus plans are unlikely to have a net positive effect on employment, and may even harm it. Jeffrey Sachs has argued that the stimulus and associated policies "may work in the short term but they threaten to produce still greater crises within a few years"

There have also been arguments that the late 2000s crisis was caused not by excessively free markets but by the remnants of Keynesian policy. Luigi Zingales of University of Chicago argues that "Keynesianism is just a convenient ideology to hide corruption and political patronage". In February 2009, Alan Reynolds, senior fellow at the Cato Institute, acknowledged the resurgence, then proceeded to argue that evidence from various studies suggest Keynesian remedies will be ineffective and that Keynesian advocates appear to be driven by blind faith.[81] Austrian school economic historian Thomas Woods published a book, Meltdown, in 2009 which places the blame for the crises on government intervention, and blames the Federal Reserve as the primary culprit behind the financial calamity.

Critics on the left question whether government policy has become sufficiently Keynesian – looking at the US for example they consider Obama's economic team to be disappointingly centrist, with its inclusion of economists who have previously been associated with support for the neoliberal or pro free market agenda, such as Jason Furman and Larry Summers. From the radical left, sociology professor John Bellamy Foster has questioned whether the resurgence has been truly Keynesian in character, he suggests those few economists he regards as genuinely progressive such as James Galbraith are now far from the centre of government. He also asserts that it is to Marx, and not to Keynes, that society should look to for a full solution to economic problems.

2.6.4 The Keynesian resurgence in academia

With a few notable exceptions - such as Robert Shiller, James Galbraith and Paul Krugman among others - the Keynesian resurgence has been largely driven by policy makers rather than academic economists. Until very recently mainstream economists have not generally favoured robust counter-cyclical fiscal policies. While the school of thought known as New Keynesian economics has dominated the teaching of macroeconomics at universities, New Keynesians largely believed that monetary policy was enough to stabilize the economy, and largely rejected the case for interventionist fiscal policy which Keynes had advocated. Some economists (primarily post-Keynesians) have accused the New Keynesian system of being so integrated with pro-free market neo-classical influences that the label 'Keynesian' may be considered a misnomer.

Yet there has been a shift in thinking amongst many mainstream economists, paralleling the resurgence of Keynesianism among policy makers. The New York Times reported that in the 2008 annual meeting of the American Economic Association mainstream economists remained hostile or at least sceptical about the government's role in enhancing the market sector or mitigating recession with fiscal stimulus - but in the 2009 meeting virtually everyone voiced their support for such measures. However a substantial shift in opinion is less obvious in the academic literature. Speaking in March 2009, Galbraith has stated that he has not detected any changes among academic economists, nor a re-examination of orthodox opinion in the journals.

The 2008 financial crisis has led some in the economic profession to pay greater attention to Keynes's original theories. In February 2009, Robert Shiller and George Akerlof argued in their book Animal Spirits that the current US stimulus package was too small, as it does not take into account loss of confidence or do enough to restore the availability of credit. In a September 2009 article for the New York Times, on the lessons economists should learn from the crisis, Paul Krugman urged economists to move away from neoclassical models and employ Keynesian analysis:

"So here's what I think economists have to do. First, they have to face up to the inconvenient reality that financial markets fall far short of perfection, that they are subject to extraordinary delusions and the madness of crowds. Second, they have to admit ... that Keynesian economics remains the best framework we have for making sense of

recessions and depressions. Third, they'll have to do their best to incorporate the realities of finance into macroeconomics.”

2.7 SUMMARY

This unit deals with the post Keynesian theories of demand for money. First of all, Patinkin's approach to demand for money and his real balance effect were discussed. The real-balance effect is one of three basic effects that indicate why aggregate expenditures are inversely related to the price level. Secondly, The Baumol-Tobin model is explained as an economic model of the transactions demand for money as developed independently. Thirdly Friedman and his modern quantity theory were dealt in detail. Crisis in Keynesianism and its aftermath on economies was described. And finally the revival of Keynesianism was revealed with suitable examples.

2.8 FURTHER READINGS

- Friedman, Milton (1956) "The Quantity Theory of Money--A Restatement," in
- Milton Friedman, ed., Studies in the Quantity Theory of Money. Chicago:
- Mayer, Thomas, et.al (1978) The Structure of Monetarism, New York: W.W. Norton. A survey of and debate about the broader aspects of monetarism by both monetarist and non-monetarist economists.

**POST GRADUATE PROGRAMME
M.A. (Final)
Economics**

**DISTANCE EDUCATION
SELF INSTRUCTIONAL MATERIAL**

BLOCK : IV - SUPPLY OF MONEY

Unit-1 Approaches and theories of money supply

Unit - 2 Theories of inflation

BLOCK 4 SUPPLY OF MONEY

This block comprises two units. The first unit deals with approaches and theories of money supply. Theory of money supply and behavioral model of money supply have been discussed followed by demand for money supply and its determinants. RBI's approach to money supply; high powered money and money multiplier; budget deficit and money supply in an open economy will be some important areas of discussion.

The second unit gives you the understanding the theories of inflation. Classical theory of inflation has been revealed with Keynesian and Monetarists view. Structuralist approaches to inflation are explained and Philips curve analysis is described in a detailed manner. Samuelson and Solow's approach has been discussed along with natural rate of unemployment. Tobin's modified Philips curve, adaptive expectations and rational expectations and economic policies to control inflation are explained in detail to give readers a broad picture of inflation theories.

UNIT 1

APPROACHES AND THEORIES OF MONEY SUPPLY

Objectives

On successful completion of this unit, you should be able to:

- Appreciate the concept money supply and theory of money supply
- Identify the demand for money in different environments
- Know the RBI's approach to money supply
- Recognize the concept of high powered money and money multiplier.
- Explain the term budget deficit in detailed manner
- Understand the money supply patterns in the open economies

Structure

- 1.1 Introduction
- 1.2 Theory of money supply and behavioral model.
- 1.3 Demand for money supply
- 1.4 RBI's approach to money supply
- 1.5 High powered money and money multiplier
- 1.6 Budget deficit
- 1.7 Money supply in an open economy

1.8 Summary

1.9 Further readings

1.1 INTRODUCTION

In economics, money supply or money stock is the total amount of money available in an economy at a particular point in time. There are several ways to define "money", but standard measures usually include currency in circulation and demand deposits.

Money supply data are recorded and published, usually by the government or the central bank of the country. Public and private-sector analysts have long monitored changes in money supply because of its possible effects on the price level, inflation and the business cycle.

That relation between money and prices is historically associated with the quantity theory of money. There is strong empirical evidence of a direct relation between long-term price inflation and money-supply growth. These underlie the current reliance on monetary policy as a means of controlling inflation. This causal chain is however contentious, with heterodox economists arguing that the money supply is endogenous and that the sources of inflation must be found in the distributional structure of the economy.

In this unit we are going to discuss some main approaches to money supply and its theories.

1.2 THEORY OF MONEY SUPPLY AND BEHAVIORAL MODEL

Money Supply Theory in macroeconomics refers to the study of the quantity of money available at the hands of people within the economy to buy goods, services and securities. The interest rate is the value of money over time that is the price paid for acceding payment of monetary debts. These two are inversely proportional as the supply of money increases the interest rate decreases. The equilibrium at the money market is reached when the quantity of money demanded and supplied becomes equal to the rate of interest.

Money involves both coins and banknotes; therefore the supply of money in an economy will consist of both the supply of banknotes and coins. Precisely the concept of

money supply involves the sum total of all electronic, credit-based bank deposits balance accounts along with the printed-paper notes and minted coins. According to the principle, money is a medium of transaction that is utilized in settling a debt. Money supply can take place in varying measures. The narrowest measure counts only liquid money while the broader measure takes into account the form that deals money as a store of value. The situation of inflation occurs when the supply of money increases to an extreme level.

Because so much of the Chicago School is a reaction to Keynesianism, it's important to understand the latter before the former. The following is a brief introduction to Keynesian theory.

Although no one knows the ultimate cause of business cycles, most economists (even conservative ones) accept Keynes' explanation of what happens during them. In a normal economy, Keynes said, there is a circular flow of money. My spending becomes part of your earnings, and your spending becomes part of my earnings.

For various reasons, however, this circular flow can falter. Suppose that you are experiencing tough times, or see them on the horizon. Your natural response is to start hoarding money to make it through. There are many possible ways this process might start, all of which are open to argument. It could be a loss of consumer confidence in the economy, perhaps triggered by a visible event like a stock market crash. It could be a natural disaster, such as a drought, earthquake or hurricane. It could be a sudden loss of jobs, or a weak sector of the economy. It could be inequality of wealth, which results in the rich producing a surplus of goods, but leaving the poor too poor to buy them. It could be something intrinsic within the economy which causes it to go through a natural cycle of expansions and contractions. Or it could be the central bank tightening the money supply too much, depriving people of dollars in the first place.

Whatever the reason, let's suppose you decide to hoard money to make it through the hard times ahead. But if you're not spending, then I'm not earning, and in response to my own hard times, I'll start hoarding money as well. This breakdown of the circular flow results in a drop in economic activity, raise in unemployment, and a recession. To get the circular flow started again, Keynes suggested that the central bank should expand the money supply. This would put more money in people's hands, inspire consumer confidence, and compel them to start spending again.

In the U.S., the central bank is the Federal Reserve System. It expands the money supply by buying U.S. securities on the open market. The money it pays to individual buyers therefore increases the amount of money in circulation. To contract the money supply, the Fed does the opposite: it sells securities. The money it receives from these transactions represents money taken out of circulation. Other methods that the Fed uses to control the money supply include credit restrictions among member banks, changing the prime lending rate, and moral suasion (using its considerable clout to get banks to voluntarily adopt a policy). So the Fed has many tools to expand the money supply -- which one gets used depends on the situation.

In extreme cases like depressions, Keynes suggested that the government should "prime the pump" of the economy, by doing what the people were unwilling to do: spend. (This spending would have to be with borrowed money, obviously, since taxing and spending would not increase the money supply.) Virtually all economists believe that deficit spending on national defense, in preparation for World War II, is what pulled the U.S. and other nations out of the Great Depression.

Controlling the money supply through the central bank is known as *monetary policy*. Controlling it through deficit government spending is called *fiscal policy*.

Now, if expanding the money supply results in increased economic activity, why can't the central bank create prosperity by just printing money as fast as it can? The problem is that this results in inflation. For example, let's suppose the central bank printed so much money that it made every American a millionaire. After everyone retired, they would notice that no more workers or servants are left to do their bidding... so they would attract them by raising their wages, sky-high if necessary. This, of course, is the essence of inflation. Eventually, prices would soar so high that it would no longer mean anything to be a millionaire. Soon, everyone would be back working at their same old jobs.

To fight inflation, the central bank does the opposite: it contracts the money supply. By removing money from the market, people no longer have cash to make the transactions they would normally make. The result is greater unemployment. In theory, this type of high unemployment should cause money to deflate. This should happen in two ways. The unemployed person who used to make \$10 an hour might agree to take a

job for \$7 an hour, because something is better than nothing. And a merchant who used to sell widgets for \$10 in a better economy might agree to sell them for \$7 in a recession, because a sale is better than no sale. So, just like the millionaire example above, the amount of economic activity will readjust itself to the new level of money, and everything will be the same as it was before.

The problem with the second half of this story is that something quite different happens in real life. Money inflates easily and quickly, but it deflates slowly and at great cost. In a downward direction, prices are said to suffer from "price rigidities" or "price stickiness." There are several reasons for this. One is psychological -- people hate to cut their prices and wages. Another is that salaries and wages are often locked into contracts, the average of which is three years. And for many, cutting prices incurs certain costs (reprinting, recalculating, reprogramming, etc.) that may not make the price change seem worth it. Even if they do decide to change prices, it takes many companies quite some time to put them into effect. Sears, for example, has to reprint and remail all its catalogues. Another likely reason is that entrepreneurs don't want to sell things below cost, so they might wait for their suppliers to cut prices first -- but in a circular economy, everyone would be waiting for everyone else to cut their prices. The penalty for cutting prices first is a profit loss. Furthermore, with reduced sales volume, the unit cost of production is already going up, which only makes price reduction all the more difficult.

But perhaps the most important reason why prices are rigid is because people are nearly rational, not perfectly rational. This is the New Keynesian idea, and it's getting ahead of our story a bit, because this idea only surfaced after the Chicago School's had failed. Still, it's worth noting here for completeness' sake. New Keynesians argue that even though people know they are in a recession, they often don't know how much to deflate their prices and wages to get themselves out of it. They could if they were perfect calculating machines with perfect information, but they're not.

For example, suppose you run an Italian restaurant, and a recession hits. Where should your prices be? The answer would require you to know a wealth of information. One of the most important is how your restaurant competes against all the others in your area -- a true "apples and oranges" comparison, in that these other restaurants are French, Mexican, Chinese, etc., and they all have different profits, clienteles, trends, and

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advertising campaigns. You will also need to know what the inflation, unemployment and prime lending rates will be. A supercomputer might be able to solve this incredibly complex math problem, but humans cannot. They can only make best guesses. They may have a good idea of the range where their prices should be, but humans are self-interested, and usually err on the top end of this range. As a result, prices tend to resist deflating. This behavior might seem objectively irrational, but fixing it would require turning humans into supercomputers.

Price stickiness means that shrinking the money supply is translated into unemployment, not falling prices. In the days of the gold standard, when the amount of money possessed by a nation equaled its gold supply, an outflow of gold from a nation's treasury was always followed by high unemployment, sometimes even depression, rather than falling prices. The Great Depression was an extreme example of this. By 1933, the U.S. money supply had shrunk by nearly a third. But the Great Depression would drag on for another seven years, with the natural deflation of money proceeding at a glacial pace. It wasn't until World War II that the government was forced to conduct a massive monetary expansion. The result was such explosive economic growth that the U.S. economy doubled in size between 1940 and 1945, the fastest period of growth in U.S. history. Yet another example is Japan in the 1990s. The Japanese economy has been stagnating for five years now, and many economists have criticized the Japanese government for not doing more to expand the money supply. Japan's problems are controversial, but whatever the solution, the important point is that Japan's government has done very little, and its economy has not deflated or adjusted itself -- Japan's economic pain continues five years later.

But slow as it may be, deflation does occur. Many conservatives therefore argue that the economy is self-correcting, and government should leave the money supply alone. Keynes did not deny that slumps were self-correcting in the long run. But he said: "In the long run we are all dead." What he meant by this famous but frequently misunderstood remark is that it makes no sense to wait for catastrophes to correct themselves if social policy can do the job far more quickly.

How does all this relate to national economic policy? Keynesians believe their policies allow the government to take the rough edges off the business cycle. In other

words, Keynesian policy is *counter-cyclical*: when unemployment starts rising, the government expands the money supply; when inflation starts rising, the government contracts the money supply. Another way of putting this is that the government is involved in a balancing act, creating just enough money to cover the natural amount of economic activity, without leaning either towards inflation or unemployment.

1.3 DEMAND FOR MONEY SUPPLY

According to popular thinking not every increase in the supply of money will have an effect on the production of goods. For instance, if an increase in supply is matched by a corresponding increase in the demand for money then there won't be any effect on the economy. The increase in the supply of money is neutralised so to speak by an increase in the demand for money or the willingness to hold a greater amount of money than before. In his speech on November 15 2001 the present Governor of the Bank of England Mervyn King said,

...monetary policy is indeed impotent when interest rates are zero. At this point, households and firms have an infinitely elastic demand for money balances, and so any increase in money supply is absorbed passively in higher balances. An increase in money supply has no implications for spending or output. (*Mervyn King, No money, no inflation — the role of money in the economy. Bank of England Quarterly Bulletin, Summer 2002*)

In his recent speech on May 2 2007 to the Society of Business Economists the Governor of the Bank of England has further elaborated on the issue of supply and demand for money.

How should a policymaker respond to developments in money and credit? One approach is to ignore them on the grounds that they contain no incremental information about the outlook for inflation. This approach — which is compatible with many modern models of inflation — may well appear appropriate when money growth is associated with shocks to the demand for money that have few, if any, implications for spending and inflation. Ignoring developments in money and credit would, however, be a mistake when there are shocks to the supply of money. (Speech by Mervyn King, *The MPC Ten Years On* — May 2007.)

What do we mean by demand for money? And how does this demand differ from demand for goods and services?

Now, demand for a good is not a demand for a particular good as such but a demand for the services that the good offers. For instance, individuals' demand for food is on account of the fact that food provides the necessary elements that sustain an individual's life and well being. Demand here means that people want to consume the food in order to secure the necessary elements that sustain life and well being.

Also, the demand for money arises on account of the services that money provides. However, instead of consuming money people demand money in order to exchange it for goods and services. With the help of money various goods become more marketable — they can secure more goods than in the barter economy. What enables this is the fact that money is the most marketable commodity.

Take for instance a baker, John, who produces ten loaves of bread per day and consumes two loaves. The eight loaves he exchanges for various goods such as fruit and vegetables. Observe that John's ability to secure fruits and vegetables is on account of the fact that he has produced the means to pay for them, which are eight loaves of bread. The baker pays for fruit and vegetables with the bread he has produced. Also note that the aim of his production of bread, apart of having some of it for himself, is to acquire other consumer goods.

Now, an increase in the John's production of bread, let us say from ten loaves to twenty a day, enables him to acquire a greater quantity and a greater variety of goods than before. As a result of the increase in the production of bread John's purchasing power has increased. This increase in the purchasing power not always can be translated in securing a greater amount of goods and services in the barter economy.

In the world of barter John may have difficulties to secure by means of bread various goods he wants. It may happen that a vegetable farmer may not want to exchange his vegetables for bread. To overcome this problem John would have to exchange his bread first for some other commodity, which has much wider acceptance than bread. In short, John is now going to exchange his bread for the acceptable commodity and then use that commodity to exchange for goods he really wants.

Note that by exchanging his bread for a more acceptable commodity John in fact raises his demand for this commodity. Also, note that John's demand for the acceptable commodity is not to hold it as such but to exchange it for the goods he wants. Again the reason why he demands the acceptable commodity is because he knows that with the help of this commodity he can convert his production of bread more easily into the goods he wants.

Now let us say that an increase in the production of the acceptable commodity has taken place. As a result of a greater amount of the acceptable commodity relative to the quantities of other goods the unitary price of the acceptable commodity in terms of goods has fallen. All this, however, has nothing to do with the production of goods.

In short, the increase in the supply of acceptable commodity is not going to disrupt the production of goods and services. Obviously if the purchasing power of the commodity were to continue declining then people are likely to replace it with some other more stable commodity. Through a process of selection people have settled on gold as the most accepted commodity in exchange. In short, gold has become money.

Let us now assume that some individual's demand for money has risen. One way to accommodate this demand is for banks to find willing lenders of money. With the help of the mediation of banks willing lenders can transfer their gold money to borrowers. Obviously such a transaction is not harmful to anyone.

Another way to accommodate the demand is instead of finding willing lenders the bank can create fictitious money — money unbacked by gold — and lend it out. Note that the increase in the supply of newly created money is given to some individuals. There must always be a first recipient of the newly created money by the banks.

This money, which was created out of "thin air", is going to be employed in an exchange for goods and services i.e. it will set in motion an exchange of nothing for something. The exchange of nothing for something amounts to the diversion of real wealth from wealth to non-wealth generating activities, which masquerades as economic prosperity. In the process genuine wealth generators are left with fewer resources at their disposal, which in turn weakens the wealth generators' ability to grow the economy.

Could a corresponding increase in the demand for money prevent the damage that money out of "thin air" inflicts on wealth generators?

Let us say that on account of an increase in the production of goods the demand for money increases to the same extent as the supply of money out of "thin air". Recall that people demand money in order to exchange it for goods. Hence at some point the holders of money out of "thin air" will exchange their money for goods. Once this happens an exchange of nothing for something emerges, which undermines wealth generators.

We can thus conclude that irrespective of whether the total demand for money is rising or falling what matters is that individuals employ money in their transactions. As we have seen once money out of 'thin air' is introduced into the process of exchange this weakens wealth generators and this in turn undermines potential economic growth. Clearly then the expansion of money out of "thin air" is always bad news for the economy. Hence the view that the increase in money out of "thin air" which is fully backed by demand is harmless doesn't hold water.

In contrast, an increase in the supply of gold money is not going to set an exchange of nothing for something and therefore will not have as such any effect on non-gold producers of goods. We can further infer that it is only the increase in money out of "thin air" that is responsible for the boom-bust cycle menace. This increase sets the boom-bust cycles irrespective of the so-called overall demand for money. We can also conclude from here that regardless of demand and increase in the supply of commodity money doesn't set boom-bust cycles.

You would think that the demand for money would be infinite. Who doesn't want more money? The key thing to remember is that wealth is not money. The collective demand for wealth is infinite as there is never enough to satisfy everyone's desires. Money, as illustrated in "How much is the per capita money supply in the U.S.?" is a narrowly defined term which includes things like paper currency, traveler's checks, and savings accounts. It doesn't include things like stocks and bonds, or forms of wealth like homes, paintings, and cars. Since money is only one of many forms of wealth, it has plenty of substitutes. The interaction between money and its substitutes explain why the demand for money changes.

1.3.1 Determinants of demand for money supply

We'll look at a few factors which can cause the demand for money to change. For a more formal treatment of theories of the demand for money see Paul Turner's Notes on "The Demand for Money".

1. Interest Rates

Two of the more important stores of wealth are bonds and money. These two items are substitutes, as money is used to purchase bonds and bonds are redeemed for money. The two differ in a few key ways. Money generally pays very little interest (and in the case of paper currency, none at all) but it can be used to purchase goods and services. Bonds do pay interest, but cannot be used to make purchases, as the bonds must first be converted into money. If bonds paid the same interest rate as money, nobody would purchase bonds as they are less convenient than money. Since bonds pay interest, people will use some of their money to purchase bonds. The higher the interest rate, the more attractive bonds become. So a rise in the interest rate causes the demand for bonds to rise and the demand for money to fall since money is being exchanged for bonds. So a fall in interest rates cause the demand for money to rise.

2. Consumer Spending

This is directly related to the fourth factor, "Demand for goods goes up". During periods of higher consumer spending, such as the month before Christmas, people often cash in other forms of wealth like stocks and bonds, and exchange them for money. They want money in order to purchase goods and services, like Christmas presents. So if the demand for consumer spending increases, so will the demand for money.

3. Precautionary Motives

If people think that they will suddenly need to buy things in the immediate future (say it's 1999 and they're worried about Y2K), they will sell bonds and stocks and hold onto money, so the demand for money will go up. If people think that there will be an opportunity to purchase an asset in the immediate future at a very low cost, they will also prefer to hold money.

4. Transaction Costs for Stocks and Bonds

If it becomes difficult or expensive to quickly buy and sell stocks and bonds, they will be less desirable. People will want to hold more of their wealth in the form of money, so the demand for money will rise.

5. Change in the General Level of Prices

If we have inflation, goods become more expensive, so the demand for money rises. Interestingly enough, the level of money holdings tends to rise at the same rate as prices. So while the nominal demand for money rises, the real demand stays precisely the same. (To learn the difference between nominal demand and real demand, see "What's the Difference Between Nominal and Real?")

6. International Factors

Usually when we discuss the demand for money, we're implicitly talking about the demand for a particular nation's money. Since Canadian money is a substitute for American money, international factors will influence the demand for money. From "A Beginner's Guide to Exchange Rates and the Foreign Exchange Market" we saw that the following factors can cause the demand for a currency to rise:

1. An increase in the demand of that country's goods abroad.
2. An increase in the demand for domestic investment by foreigners.
3. The belief that the value of the currency will rise in the future.
4. A central banking wanting to increase its holdings of that currency.

Demand for Money Wrap Up

The demand for money is not at all constant. There are quite a few factors which influence the demand for money.

Factors Which Increase the Demand for Money

1. A reduction in the interest rate.
2. A rise in the demand for consumer spending.
3. A rise in uncertainty about the future and future opportunities.
4. A rise in transaction costs to buy and sell stocks and bonds.
5. A rise in inflation causes a rise in the nominal money demand but real money demand stays constant.
6. A rise in the demand for a country's goods abroad.
7. A rise in the demand for domestic investment by foreigners.
8. A rise in the belief of the future value of the currency.
9. A rise in the demand for a currency by central banks (both domestic and foreign).

1.4 RBI'S APPROACHES TO MONEY SUPPLY

In a monetary economy, where each single transaction is valued in terms of the unit of national currency, it is nothing but a truism to say that money supply has a role in determining the price level in the economy. Analytically viewed, in the short run, with output fixed, the price level is essentially determined by the excess demand condition in the economy, which depends on the level of demand for and supply of real money balances. It is thus natural that once the real money balance is increased above what is demanded by people the pressure would be felt on the demand for goods and services or assets, leading to an increase in their prices. Although this exposition of the money and price relationship is familiar to all of us, there is no denying the fact that changes in the price level can be caused by several other internal and external shocks, which influence the cost structure of firms. However, a continuous pressure on prices, which is what inflation is all about, cannot be sustained, if there is no accommodating increase in money supply. It is in this sense that inflation is a monetary phenomenon.

There are three important qualifications to this statement. First, there could be a variable lag between the time a monetary change is initiated and the time its ultimate impact on prices and output is felt. The length of this lag is determined by the inherent dynamics in the real sector and the speed with which economic agents adjust to a change in monetary situation. Therefore, a monetary shock may take several months to express itself on prices and output. Second, it is also essential to differentiate between a relative price change and its immediate impact on overall price situation, on the one hand, and the persistent increase in prices on the other. The former effect can be caused by a sudden shock to the cost structure of a firm, which may raise the price of its product relative to others, causing some reallocation of resources and at the same time raising the overall price level in the economy to some extent. However, given the size of nominal demand, which is largely determined by the growth of real income and the money supply, a relative price shock cannot cause a sustained increase in the overall price level in the economy. For this to happen, it would require a concomitant increase in money supply. This is the reason why the overall price effect of an increase in administered price tends to be higher when monetary policy is already slack and there exists an inflationary

pressure in the economy. It is, therefore, important to recognise that from the medium to long run perspective, controlling money supply growth becomes integral to contain inflationary pressure in the economy. As John Crow, the former Governor of Bank of Canada has noted -

'The reason Central Banks persistently focus on inflation, monetary aggregate targets, is not that they view inflation as the only significant economic issue facing modern industrial states. Far from it. More reasonably, they take the considered view that what they are unavoidably responsible for - managing primary liquidity and in that crucial sense in creating money - will in the end also be the crucial factor in what happens to inflation, and that good inflation performance is a plus for the economy as a whole'.

The effectiveness of monetary policy in causing an impact on the price level also depends on inflation expectations. For example, while the expansionary effect of fiscal policy will not persist for long without an accommodating increase in money supply, the interest rate effect may, however, get sustained, giving rise to inflation expectations, and thereby adversely affecting the effectiveness of monetary policy to fight inflation.

Given the above theoretical backdrop what are the empirical relationships between inflation and money supply growth in the Indian economy? Many studies have shown that the relationship between prices on the one hand and income and money supply on the other is found to hold reasonably well over a period of time. Averages of price changes over a period of four to five years are predicted with reasonable accuracy by these equations and these predictions fall within a range which should be sufficient guide to policy. Seeking to find a direct year to year correspondence between changes in money supply and real income and the price level is a simplistic approach to the problem which overlooks the inherent lags in the functioning of an economy. Apart from my earlier studies in this regard which I had reported in my presidential address to the Indian Economic Association in 1988 and the Lakdawala Memorial Lecture in 1994, the price equation estimated using the data for the period 1972-73 to 1993-94 shows that prices move in tandem with money supply in the long run.

The Reserve Bank of India (Amendment) Act, 2006 gives discretion to the Reserve Bank to decide the percentage of scheduled banks' demand and time liabilities to

be maintained as Cash Reserve Ratio (CRR) without any ceiling or floor. Consequent to the amendment, no interest will be paid on CRR balances so as to enhance the efficacy of the CRR, as payment of interest attenuates its effectiveness as an instrument of monetary policy.

The Reserve Bank of India (RBI) follows a multiple indicator approach to arrive at its goals of growth, price stability and financial stability, rather than targeting inflation alone. This, of course, leads to criticism from mainstream economists. In its effort to balance many objectives, which often conflict with each other, RBI looks confused, ineffective and in many cases a cause of the problems it seeks to address.

The RBI has certain weapons which it wields every time and in all situations to counter any form of inflationary situation in the economy. These weapons are generally the mechanisms and the policies through which the Central Bank seeks to control the amount of credit flowing in the market. The general stance adopted by the RBI to fight inflation is discussed in brief in part (A) of the paper. Part (B) would raise the question of whether this mechanism used by the RBI has passed its prime and thus now the RBI needs to take up a holistic approach to the same. Part (C) would then deal very briefly with the suggestions that may shed some light on what could be the possible steps RBI could take to control rising prices.

It is interesting to note that the Reserve Bank of India Governor, Dr Y. V. Reddy started his stint with the aim of cutting down the Cash Reserve Ratio to 3 per cent (from the then 4.5 per cent) but rising commodities inflation has forced him to raise it now to 6.5 per cent. But even this 6.5 per cent is way below what would truly contain inflation and it is almost certain that he will be chasing the inflation curve for the next few years or so.

1.4.1 Fractional-reserve banking

The different forms of money in government money supply statistics arise from the practice of fractional-reserve banking. Whenever a bank gives out a loan in a fractional-reserve banking system, a new sum of money is created. This new type of money is what makes up the non-M0 components in the M1-M3 statistics. In short, there are two types of money in a fractional-reserve banking system:

1. central bank money (physical currency, government money)

2. commercial bank money (money created through loans) - sometimes referred to as private money, or checkbook money

In the money supply statistics, central bank money is MB while the commercial bank money is divided up into the M1-M3 components. Generally, the types of commercial bank money that tend to be valued at lower amounts are classified in the narrow category of M1 while the types of commercial bank money that tend to exist in larger amounts are categorized in M2 and M3, with M3 having the largest.

Reserves are deposits that banks have received but have not loaned out. In the USA, the Federal Reserve regulates the percentage that banks must keep in their reserves before they can make new loans. This percentage is called the minimum reserve. This means that if a person makes a deposit for \$1000.00 and the bank reserve mandated by the FED is 10% then the bank must increase its reserves by \$100.00 and is able to loan the remaining \$900.00. The maximum amount of money the banking system can legally generate with each dollar of reserves is called the (theoretical) money multiplier, and is calculated as the reciprocal of the minimum reserve. For a reserve of 10% the money multiplier, followed by the infinite geometric series formula, is the reciprocal of 10%, which is 10.

Example

Note: The examples apply when read in sequential order.

M0

- Laura has ten US \$100 bills, representing \$1000 in the M0 supply for the United States. (MB = \$1000, M0 = \$1000, M1 = \$1000, M2 = \$1000)
- Laura burns one of her \$100 bills. The US M0, and her personal net worth, just decreased by \$100. (MB = \$900, M0 = \$900, M1 = \$900, M2 = \$900)

M1

- Laura takes the remaining nine bills and deposits them in her checking account at her bank. The bank then calculates its reserve using the minimum reserve percentage given by the Fed and loans the extra money. If the minimum reserve is 10%, this means \$90 will remain in the bank's reserve. The remaining \$810 can be used by the bank as lending money, but until that happens it will be part of the bank's excess reserves. (MB = \$900, M0 = 0, M1 = \$900, M2 = \$900)

- The M1 money supply increased by \$810 when the loan is made. M1 money has been created. ($MB = \$900$, $M0 = 0$, $M1 = \$1710$, $M2 = \$1710$)
- Laura writes a check for \$400, check number 7771. The total M1 money supply didn't change, it includes the \$400 check and the \$500 left in her account. ($MB = \$900$, $M0 = 0$, $M1 = \$1710$, $M2 = \$1710$)
- Laura's check number 7771 is destroyed in the laundry. M1 and her checking account still have \$900 because the check is never cashed. ($MB = \$900$, $M0 = 0$, $M1 = \$1710$, $M2 = \$1710$)
- Laura writes check number 7772 for \$100 to her friend Alice, and Alice deposits it into her checking account. M0 still has that \$900 in it, Alice's \$100 and Laura's \$800. ($MB = \900, $M0 = 0$, $M1 = \$1710$, $M2 = \$1710$)
- The bank lends Mandy the \$810 that Laura deposited on her bank. Mandy deposits the money in a checking account at another bank. The other bank must keep \$81 as a reserve and has \$729 available for loans. The M1 money supply is now inflated by \$729 ($MB = \900, $M0 = 0$, $M1 = \$2439$, $M3 = \$2439$)
- Mandy's bank now lends the money to someone else who deposits it on a checking account on another bank, who again stores 10% as reserve and has 90% available for loans. This process repeats itself at the next bank and at the next bank and so on, until the money in the reserves backs up an M1 money supply of \$9000, which is 10 times the M0 money. ($MB = \$900$, $M0 = 0$, $M1 = \$9000$, $M2 = \$9000$)

M2

- Laura writes check number 7774 for \$1000 and brings it to the bank to start a Money Market account. M0 goes down by \$1000, but M2 stayed the same, because M2 includes the Money Market account, but also everything in M1. ($M0 = \$4900$, $M1 = \$6710$, $M2 = \$6710$)

Foreign Exchange

- Laura writes check number 7776 for \$200 and brings it downtown to a foreign exchange bank teller at Credit Suisse to convert it to British Pounds. On this particular day, the exchange rate is exactly $USD \$2.00 = GBP £1.00$. The bank Credit Suisse takes her \$200 check, and gives her two £50 notes (and charges her

a dollar for the service fee). Meanwhile, at the Credit Suisse branch office in Hong Kong, a customer named Huang has £100 and wants \$200, and the bank does that trade (charging him an extra £.50 for the service fee). US M0 still has the \$900, although Huang now has \$200 of it. The £50 notes Laura walks off with are part of Britain's M0 money supply that came from Huang.

- The next day, Credit Suisse finds they have an excess of GB Pounds and a shortage of US Dollars, determined by adding up all the branch offices' supplies. They sell some of their GBP on the open FX market with Deutsche Bank, which has the opposite problem. The exchange rate stays the same.
- The day after, both Credit Suisse and Deutsche Bank find they have too many GBP and not enough USD, along with other traders. To move their inventories, they have to sell GBP at USD \$1.999, that is, 1/10 cent less than \$2 per pound, and the exchange rate shifts. None of these banks has the power to increase or decrease the British M0 or the American M0; they are independent systems.

1.5 HIGH-POWERED MONEY AND MONEY MULTIPLIER

Also termed the monetary base, the total of currency held by the nonbank public, vault cash held by banks, and Federal Reserve deposits of the banks. This contains the monetary components over which the Federal Reserve System has relatively complete control and is often used as a guide for the Fed's money control ability and monetary policy.

This term 'high powered money', used to denote the monetary liabilities of a central bank. It consists of cash in the hands of the public and the cash reserves of the banking sector at the central bank. It is so called because it forms the base on which the larger superstructure of convertible bank deposits is built. A change in the quantity of these assets produces a larger than proportionate change in the bank-deposit component of the money stock; this is the effect of the credit or money multiplier. For example, when the central bank sells an asset through an open-market operation, the buyer pays the central bank with a check on his or her own bank, thereby reducing that bank's balance with the central bank. Since the central bank usually stipulates a minimum ratio of cash reserves at the central bank to demand deposits, this bank must sell an asset in order to

restore its depleted cash balance. The second purchaser, in turn, pays by check from another bank and in the process transfers the cash shortage from the first bank to the second. In this way, the multiplier process continues and the initial open-market sale by the central bank causes a more than proportionate fall in bank assets and deposits—and hence, in the money supply.

1.5.1 Money multiplier

The money multiplier (also called the credit multiplier or the deposit multiplier) is a measure of the extent to which the creation of money in the banking system causes the growth in the money supply to exceed growth in the monetary base.

The multiplier is the multiple by which the expansion in the money supply is greater than the increase in the monetary base: if the multiplier is 10, then a £1 increase in the monetary base will cause a £10 increase in the money supply.

Most discussions of the multiplier do not discuss what measure of the money supply is being increased. As it is usually restricted to deposits in banks, this implies that we are talking about M1 (most commonly) or M2. Multipliers can also be calculated for broad money measures such as M3 and M4.

1.5.2 The deposit expansion multiplier

The easiest way to understand how the multiplier works is to consider what happens under simplifying assumptions:

- Banks keep a fixed fraction of deposits to meet the reserve requirement.
- Customers of the banks pay each other by cheque (or transfer etc.) but not by withdrawing cash to make payments.
- When customers do not receive these payments they do not withdraw any of the money from the bank.

Now consider a the following sequence of events

1. An initial deposit is made of £100
2. The bank is able to lend £90 of this. The borrower draws cheques against the £90 balance now in their account that the payees deposit in accounts in the same of other banks. Now customer balances have increased by the original £100 plus the £90 from the new cheque deposits: a total of £190

3. The bank can now lend 90% of the £90, a further £81.
4. Total deposits are now increased by another £81 to £ to £271
5. This process repeats and the total increase in bank deposits is 10 times the amount initially deposited: i.e. £1,000

As you might infer from the above, the multiplier is the reciprocal of the reserve requirement. If the reserve requirement was (a very high) 20% the multiplier would be $1 \div 0.2 = 5$

1.5.3 The complex multiplier

The above illustrates the principal, but what happens if we lift the simplifying assumptions? Customers will keep some money as cash rather than in the bank, and banks will keep central bank balances and cash for transactions in addition to the reserve requirement. This gives us a similar formula for the complex multiplier:

$$(1 + c)/(r + e + c)$$

Where:

c is the proportion of their money customers keep as cash,

r is the reserve requirement, and,

e is the reserves banks keep in addition to the reserve requirement.

There are plenty of other corrections that can be made, and more complex models than a simple static multiple. This being economics there is also plenty of argument about the significance of the money multiplier, its determinants, and even whether it exists in all modern economies.

In fact, the most common mechanism used to measure this increase in the money supply is typically called the money multiplier. It calculates the maximum amount of money that an initial deposit can be expanded to with a given reserve ratio – such a factor is called a multiplier. As a formula, if the reserve ratio is R , then the money multiplier m is the reciprocal, $m = 1 / RR$, and is the maximum amount of money commercial banks can legally create for a given quantity of reserves.

In the re-lending model, this is alternatively calculated as a geometric series under repeated lending of a geometrically decreasing quantity of money: reserves lead loans. In endogenous money models, loans lead reserves, and it is not interpreted as a geometric series.

The money multiplier is of fundamental importance in monetary policy: if banks lend out close to the maximum allowed, then the broad money supply is approximately central bank money times the multiplier, and central banks may finely control broad money supply by controlling central bank money, the money multiplier linking these quantities; this was the case in the United States from 1959 through September 2008.

If, conversely, banks accumulate excess reserves, as occurred in such financial crises as the Great Depression and the Financial crisis of 2007–2010 – in the United States since October 2008, then this equality breaks down, and central bank money creation may not result in commercial bank money creation, instead remaining as unlent (excess) reserves. However, the central bank may shrink commercial bank money by shrinking central bank money, since reserves are required – thus fractional-reserve money creation is likened to a string, since the central bank can always pull money out by restricting central bank money, hence reserves, but cannot always push money out by expanding central bank money, since this may result in excess reserves, a situation referred to as "pushing on a string".

1.6 BUDGET DEFICIT

A budget deficit occurs when an entity spends more money than it takes in. The opposite of a budget deficit is a budget surplus. Debt is essentially an accumulated flow of deficits. In other words, a deficit is a flow, and debt is a stock.

An accumulated governmental deficit over several years (or decades) is referred to as the government debt. Government debt is usually financed by borrowing, although if a government's debt is denominated in its own currency it can print new currency to pay debts. Monetizing debts, however, can cause rapid inflation if done on a large scale. Governments can also sell assets to pay off debt. Most governments finance their debts by issuing long-term government bonds or shorter term notes and bills. Many governments use auctions to sell government bonds.

Governments usually must pay interest on what they have borrowed. Governments reduce debt when their revenues exceed their current expenditures and

interest costs. Otherwise, government debt increases, requiring the issue of new government bonds or other means of financing debt, such as asset sales.

According to Keynesian economic theories, running a fiscal deficit and increasing government debt can stimulate economic activity when a country's output (GDP) is below its potential output. When an economy is running near or at its potential level of output, fiscal deficits can cause inflation

1.6.1 Primary deficit, total deficit, and debt

The government's deficit can be measured with or without including the interest it pays on its debt. The primary deficit is defined as the difference between current government spending and total current revenue from all types of taxes. The total deficit (which is often just called the 'deficit') is spending, plus interest payments on the debt, minus tax revenues.

Therefore, if t is a timeframe, G_t is government spending and T_t is tax revenue for the respective timeframe, then

$$\text{Primary deficit} = G_t - T_t$$

If D_{t-1} is last year's debt, and r is the interest rate, then

$$\text{Total deficit} = G_t + rD_{t-1} - T_t$$

Finally, this year's debt can be calculated from last year's debt and this year's total deficit:

$$D_t = (1 + r)D_{t-1} + G_t - T_t$$

Economic trends can influence the growth or shrinkage of fiscal deficits in several ways. Increased levels of economic activity generally lead to higher tax revenues, while government expenditures often increase during economic downturns because of higher outlays for social insurance programs such as unemployment benefits. Changes in tax rates, tax enforcement policies, levels of social benefits, and other government policy decisions can also have major effects on public debt. For some countries, such as Norway, Russia, and members of the Organization of Petroleum Exporting Countries (OPEC), oil and gas receipts play a major role in public finances.

Inflation reduces the real value of accumulated debt. If investors anticipate future inflation, however, they will demand higher interest rates on government debt, making public borrowing more expensive.

1.6.2 Structural deficits, cyclical deficits, and the fiscal gap

At the lowest point in the business cycle, there is a high level of unemployment. This means that, tax revenues are low and expenditure (e.g. on social security) are high. Conversely, at the peak of the cycle, unemployment is low, increasing tax revenue and decreasing social security spending. The additional borrowing required at the low point of the cycle is the cyclical deficit. By definition, the cyclical deficit will be entirely repaid by a cyclical surplus at the peak of the cycle.

The structural deficit is the deficit that remains across the business cycle, because the general level of government spending is too high for prevailing tax levels. The observed total budget deficit is equal to the sum of the structural deficit with the cyclical deficit or surplus.

Some economists have criticized the distinction between cyclical and structural deficits, contending that the business cycle is too difficult to measure to make cyclical analysis worthwhile.

The fiscal gap, a measure proposed by economists Alan Auerbach and Lawrence Kotlikoff, measures the difference between government spending and revenues over the very long term, typically as a percentage of Gross Domestic Product. The fiscal gap can be interpreted as the percentage increase in revenues or reduction of expenditures necessary to balance spending and revenues in the long run. For example, a fiscal gap of 5% could be eliminated by an immediate and permanent 5% increase in taxes or cut in spending or some combination of both. It includes not only the structural deficit at a given point in time, but also the difference between promised future government commitments, such as health and retirement spending, and planned future tax revenues. Since the elderly population is growing much faster than the young population in many countries, many economists argue that these countries have important fiscal gaps beyond what can be seen from their deficits alone.

1.6.3 National budget deficits (2004)

United States deficit or surplus percentage 1901 to 2006

National Government Budgets for 2004 (in billions of US\$)						
Nation	GDP	Revenue	Expenditure	Exp ÷ GD	Budget Deficit/Surplus	Deficit ÷ GDP
US (federal)	11700	1862	2338	19.98%	-25.56%	-4.07%
US (state)	-	900	850	7.6%	+5%	+0.4%
Japan	4600	1400	1748	38.00%	-24.86%	-7.57%
Germany	2700	1200	1300	48.15%	-8.33%	-3.70%
United Kingdom	2100	835	897	42.71%	-7.43%	-2.95%
France	2000	1005	1080	54.00%	-7.46%	-3.75%
Italy	1600	768	820	51.25%	-6.77%	-3.25%
China	1600	318	349	21.81%	-9.75%	-1.94%
Spain	1000	384	386	38.60%	-0.52%	-0.20%
Canada (federal)	900	150	144	16.00%	+4.00%	+0.67%
South Korea	600	150	155	25.83%	-3.33%	-0.83%

Data are for 2004.

1.6.4 Economic Effects of a Budget Deficit

Increased borrowing

The government will have to borrow from the private sector, it does this by asking the Bank of England to sell bonds and gilts to the private sector.

Higher debt interest payments

Selling bonds will increase the national debt, this is currently £300 billion. The annual interest payments is approximately £23 billion, this has a high opportunity cost because it requires future generations to pay higher taxes.

Increased AD

A budget deficit implies lower taxes and increased G, this will increase AD and this may cause higher Real GDP and inflation.

Higher Taxes and lower spending

In the future the government may have to increase taxes or cut spending in order to reduce the deficit. This may cause reduced incentives to work

Increased Interest rates

If the government sells more bonds this is likely to cause interest rates to increase. This is because they will need to increase interest rates in order to attract investors to buy the extra debt.

If government interest rates increase this will push up other interest rates as well.

Crowding Out

Increased government borrowing may cause a decrease in the size of the private sector (see fiscal policy)

Inflation:

- In extreme circumstances the government may increase the money supply to pay the debt, however this is unlikely to occur in the UK
- If the government sells short term gilts to the banking sector then there will be an increase in the money supply, this is because banks see gilts as near money therefore they can maintain there lending to customers.

However they will also be increasing the money supply by lending to the government.

1.7 MONEY SUPPLY IN AN OPEN ECONOMY

In an open economy the domestic money supply can be affected depending on the type of exchange rate system the country is on.

Flexible Exchange rate system

Under a flexible exchange rate system, the country's balance of payment will always balance. Should the country experience a balance of payment surplus for example or a situation of an excess supply of foreign currency (or an excess demand for domestic currency), the domestic currency will appreciate vis-à-vis the foreign currency. The appreciation makes domestic goods more expensive and imported goods cheaper resulting in a decline in domestic X and an increase in imports. In a flexible exchange rate system, a surplus in the balance of payment results in an appreciation of the domestic currency which then eliminates the surplus. Vice versa had we started off with a balance of payment deficit, the excess demand for foreign currency (or excess supply of domestic currency) would have resulted in a depreciation of the domestic currency vis-à-vis the foreign currency.

This now makes domestic goods cheaper relative to imports. The increase in net exports therefore reduces the deficit in the balance of payment. Since the balance of payment always balances through the adjustments in the exchange rate, there will be no effect on the domestic money supply.

There are 2 types of Monetary Policy to control money supply:

1. Direct Control of the Money Supply
2. Influencing the demand for credit by using interest rates.

This is the main tool of current monetary policy

1.7.1 Techniques to control the Money Supply

1. Monetary Base Control

This involves controlling the monetary base as opposed to broad liquidity this can be done by imposing a statutory cash ratio on banks. The BOE can make banks deposit 10% of their bank balances with the bank of England; this will reduce the Money Supply.

Problems with Monetary base control

- Interest Rates would be volatile as attempts were made to keep the desired range of money
- BOE is a lender of last resort, therefore banks can always get enough cash

- Banks can keep cash surplus to their requirements so they will be unaffected by min reserve requirements
- Growth in MS unreliable

2. Controlling broad liquidity:

Focusing on broad liquidity allows the government to use funding to be used as a method of controlling the MS. M3 was an important part of monetary policy until 1985

- Statutory liquidity ratio. If banks operate with a liquidity ratio of 10% then the Bank multiplier will be $1/0.1 = 10$. If the government increased this liquidity ratio to 15%, the bank multiplier would be $1/0.15 = 6$. Before 1981 UK banks had liquidity ratios placed on them, however they were removed in 1981 because of these reasons
- restrictions on banks is anti market and could lead to inefficiency
- Goodhart's law. This states that it is very difficult for the BOE to control the banking sector, because when you regulate one part of the banking system this merely diverts business to another part which is unregulated

3. Open Market Operations

If the Government wants to reduce the money supply the BOE sells more securities. When people buy them they reduce their cash holdings. Thus there will be a multiple contraction of money.

Bonds are more effective than Treasury Bills. If the government wishes to increase the MS it can buy bonds

- Funding this is when the BOE issues more government bonds and less Treasury Bills. This reduces the money supply because banks have less liquidity
- Special deposits Banks can be required to deposit a given % of their deposits with the BOE which can not be used until the BOE allows it
- THE Corset was a type of special deposit which made banks put a % of any increase in customers' deposits in the BOE

1.7.2 Problems with controlling money Supply

- Goodhart's law
- Banks can hold reserve cash above the required amount
- Not all reserve assets were under government control

- Disintermediation. If bankers can't get credit from one financial institution they will go to another
- Difficulties in selling bonds
- The effect on interest rates. If the BOE is committed to controlling the MS then it will have to fluctuate, especially if demand is inelastic

Techniques to ration Credit

If BOE wanted to reduce supply of money without increasing it then it would have to ration credit. The BOE tried to persuade banks to restrict their lending. Or limit hire purchase credit. Also a reserve ratio will affect credit Problems of rationing credit

- Goodhart's law rationing did not apply to all financial institutions
- Banks may get around these restrictions
- credit rationing stifles complementation between banks
- Works against the free market

1.7.3 Federal Reserve System

The Federal Reserve System (also known as the Federal Reserve, and informally as the Fed) is the central banking system of the United States. It was created in 1913, with the enactment of the Federal Reserve Act, and was largely a response to prior financial panics and bank runs, the most severe of which being the Panic of 1907. Over time, the roles and responsibilities of the Federal Reserve System have expanded and its structure has evolved. Events such as the Great Depression were some of the major factors leading to changes in the system. Its duties today, according to official Federal Reserve documentation, fall into four general areas:

1. Conducting the nation's monetary policy by influencing monetary and credit conditions in the economy in pursuit of maximum employment, stable prices, and moderate long-term interest rates.
2. Supervising and regulating banking institutions to ensure the safety and soundness of the nation's banking and financial system, and protect the credit rights of consumers.
3. Maintaining stability of the financial system and containing systemic risk that may arise in financial markets.

4. Providing financial services to depository institutions, the U.S. government, and foreign official institutions, including playing a major role in operating the nation's payments system.

The Federal Reserve System is subject to the Administrative Procedure Act, and so is legally obligated to inform the public about its organization, procedures and rules. In addition, the Act requires the Federal Reserve to establish uniform standards for the conduct of formal rulemaking and adjudication.

According to the board of governors, "It is not 'owned' by anyone and is 'not a private, profit-making institution'. Instead, it is an independent entity within the government, having both public purposes and private aspects." In particular, the United States Government does not own shares in the Federal Reserve System nor its component banks but does take all of its profits after salaries are paid to employees, dividends are paid to member banks, and surplus is put in a capital account. The government also exercises some control by appointing its highest level employees and setting their salaries.

According to the Federal Reserve, there are presently five different parts of the Federal Reserve System:

1. The presidentially appointed Board of Governors of the Federal Reserve System, a governmental agency in Washington, D.C.
2. The Federal Open Market Committee (FOMC), which oversees Open Market Operations, the principal tool of national monetary policy.
3. Twelve regional privately-owned Federal Reserve Banks located in major cities throughout the nation, which divide the nation into 12 districts, acting as fiscal agents for the U.S. Treasury, each with its own nine-member board of directors.
4. Numerous other private U.S. member banks, which subscribe to required amounts of non-transferable stock in their regional Federal Reserve Banks.
5. Various advisory councils.

The structure of the central banking system in the United States is unique compared to others' in the world, in that an entity outside of the central bank creates the currency. This other entity is the United States Department of the Treasury.

Purpose

The primary motivation for creating the Federal Reserve System was to address banking panics. Other purposes are stated in the Federal Reserve Act, such as "to furnish an elastic currency, to afford means of rediscounting commercial paper, to establish a more effective supervision of banking in the United States, and for other purposes." Before the founding of the Federal Reserve, the United States underwent several financial crises. A particularly severe crisis in 1907 led Congress to enact the Federal Reserve Act in 1913. Today the Fed has broader responsibilities than only ensuring the stability of the financial system.

Current functions of the Federal Reserve System include:

- To address the problem of banking panics
- To serve as the central bank for the United States
- To strike a balance between private interests of banks and the centralized responsibility of government
 - To supervise and regulate banking institutions
 - To protect the credit rights of consumers
- To manage the nation's money supply through monetary policy to achieve the sometimes-conflicting goals of
 - maximum employment
 - stable prices, including prevention of either inflation or deflation
 - moderate long-term interest rates
- To maintain the stability of the financial system and contain systemic risk in financial markets
- To provide financial services to depository institutions, the U.S. government, and foreign official institutions, including playing a major role in operating the nation's payments system
 - To facilitate the exchange of payments among regions
 - To respond to local liquidity needs
- To strengthen country's standing in the world economy

Activity 1

1. Discuss the behavioral model of money supply? What do you understand by demand for money supply?

2. Write a brief note on RBI's approaches to money supply.
3. What is the connection between high powered money and money multiplier?
4. What do you understand by term 'budget deficit'? Discuss in detail.

1.8 SUMMARY

This unit starts by introducing the concept of money supply. Money supply or money stock is the total amount of money available in an economy at a particular point in time. Theory of money supply has been explained followed by demand for money supply. RBI's approach to money supply was dealt in detail. 'High powered money' explained as the monetary liabilities of a central bank. It consists of cash in the hands of the public and the cash reserves of the banking sector at the central bank. The money multiplier (also called the credit multiplier or the deposit multiplier) is a measure of the extent to which the creation of money in the banking system causes the growth in the money supply to exceed growth in the monetary base. A budget deficit is described as occurs when an entity spends more money than it takes in. The opposite of a budget deficit is a budget surplus. Finally money supply in open economy has been explained in detail.

1.9 FURTHER READINGS

- Karl Brunner , "money supply," The New Palgrave: A Dictionary of Economics,
- Milton Friedman (1987). "quantity theory of money". The New Palgrave: A Dictionary of Economics,
- Estimated M3, John Williams' Shadow Government Statistics: Analysis Behind and Beyond Government Economic Reporting

UNIT 2

THEORY OF INFLATION

Objectives

Upon successful completion of this unit, you should be able to:

- Understand the classical and Keynesian theories of inflation
- Know monetarists and structuralist approaches to inflation
- Appreciate the Philips curve analysis
- Describe Samuelsson and Solow's views about inflation
- Explain the concept of Natural rate of unemployment
- Discuss Tobin's modified Philip curve
- Describe adaptive and rational expectations and economic policies to control inflation

Structure

- 2.1 Introduction
- 2.2 Classical theory of inflation
- 2.3 Keynesian view
- 2.4 Monetarists view
- 2.5 Structuralist approaches to inflation
- 2.6 Philips curve analysis
- 2.7 Samuelson and Solow's approach
- 2.8 Natural rate of unemployment
- 2.9 Tobin's modified Philips curve
- 2.10 Adaptive expectations and rational expectations
- 2.11 Economic policies to control inflation
- 2.12 Summary
- 2.13 Further readings

2.1 INTRODUCTION

In economics, inflation is a rise in the general level of prices of goods and services in an economy over a period of time. When the price level rises, each unit of currency buys fewer goods and services; consequently, inflation is also erosion in the purchasing power of money – a loss of real value in the internal medium of exchange and unit of account in the economy. A chief measure of price inflation is the inflation rate, the annualized percentage change in a general price index (normally the Consumer Price Index) over time.

Inflation can have positive and negative effects on an economy. Negative effects of inflation include a decrease in the real value of money and other monetary items over time; uncertainty about future inflation may discourage investment and saving, and high inflation may lead to shortages of goods if consumers begin hoarding out of concern that prices will increase in the future. Positive effects include a mitigation of economic recessions, and debt relief by reducing the real level of debt.

Economists generally agree that high rates of inflation and hyperinflation are caused by an excessive growth of the money supply. Views on which factors determine low to moderate rates of inflation are more varied. Low or moderate inflation may be attributed to fluctuations in real demand for goods and services, or changes in available supplies such as during scarcities, as well as to growth in the money supply. However, the consensus view is that a long sustained period of inflation is caused by money supply growing faster than the rate of economic growth.

Today, most mainstream economists favor a low steady rate of inflation. Low (as opposed to zero or negative) inflation may reduce the severity of economic recessions by enabling the labor market to adjust more quickly in a downturn, and reduce the risk that a liquidity trap prevents monetary policy from stabilizing the economy. The task of keeping the rate of inflation low and stable is usually given to monetary authorities. Generally, these monetary authorities are the central banks that control the size of the money supply through the setting of interest rates, through open market operations, and through the setting of banking reserve requirements.

Determinant of Theory of Inflation

The classical theory of inflation owes its genesis to certain factors. Inflation is determined by the quantity theory of money. This theory which is contained in the classical theory of inflation is employed to explain the most important and long run determinants of inflation rate and price level. Inflation is a phenomenon which takes the whole economy into its grasp. It spreads across the whole of the economy. It is such a phenomenon which impacts the whole of the economy and is concerned about the value of the mode of exchange in an economy that is, it concerns itself with money. With the rise in the supply of money the price rate rises and the value of money falls that is devaluation of money takes place.

The supply of money is controlled by the FED through a policy of open market. Open market is a powerful tool of controlling the supply of money. The demand of money actually depends on a lot of factors. These factors include interest rates, average level of prices in the economy. Every economy endeavors to reach equilibrium where the demand and supply of the money becomes equal.

2.2 CLASSICAL THEORY OF INFLATION

Classical Theory of Inflation says that money is the asset which is utilized by people to purchase goods and services on a regular basis. Money is the mode of exchange in every economy at the present day. Inflation occurs in an economy when the overall price level increases and the demand of goods and services increases.

There is another aspect of inflation which is coined as hyperinflation. Hyperinflation is another form of inflation which occurs when the price rates increase extraordinarily. The price rates reach an all time high like exceeding 50% per month when an economy is grasped by the phenomenon of hyperinflation. A good instance of such an inflation occurred in 1920 in Germany when their economy shot up to an extraordinary height. Germany experienced a hyperinflation during that period.

2.3 KEYNESIAN VIEW

Keynesian economic theory proposes that changes in money supply do not directly affect prices, and that visible inflation is the result of pressures in the economy

expressing themselves in prices. The supply of money is a major, but not the only, cause of inflation.

There are three major types of inflation, as part of what Robert J. Gordon calls the "triangle model":

- Demand-pull inflation is caused by increases in aggregate demand due to increased private and government spending, etc. Demand inflation is constructive to a faster rate of economic growth since the excess demand and favourable market conditions will stimulate investment and expansion.
- Cost-push inflation, also called "supply shock inflation," is caused by a drop in aggregate supply (potential output). This may be due to natural disasters, or increased prices of inputs. For example, a sudden decrease in the supply of oil, leading to increased oil prices, can cause cost-push inflation. Producers for whom oil is a part of their costs could then pass this on to consumers in the form of increased prices.
- Built-in inflation is induced by adaptive expectations, and is often linked to the "price/wage spiral". It involves workers trying to keep their wages up with prices (above the rate of inflation), and firms passing these higher labor costs on to their customers as higher prices, leading to a 'vicious circle'. Built-in inflation reflects events in the past, and so might be seen as hangover inflation.

Demand-pull theory states that the rate of inflation accelerates whenever aggregate demand is increased beyond the ability of the economy to produce (its potential output). Hence, any factor that increases aggregate demand can cause inflation. However, in the long run, aggregate demand can be held above productive capacity only by increasing the quantity of money in circulation faster than the real growth rate of the economy. Another (although much less common) cause can be a rapid decline in the demand for money, as happened in Europe during the Black Death, or in the Japanese occupied territories just before the defeat of Japan in 1945.

The effect of money on inflation is most obvious when governments finance spending in a crisis, such as a civil war, by printing money excessively. This sometimes leads to hyperinflation, a condition where prices can double in a month or less. Money supply is also thought to play a major role in determining moderate levels of inflation,

although there are differences of opinion on how important it is. For example, Monetarist economists believe that the link is very strong; Keynesian economists, by contrast, typically emphasize the role of aggregate demand in the economy rather than the money supply in determining inflation. That is, for Keynesians, the money supply is only one determinant of aggregate demand.

Some Keynesian economists also disagree with the notion that central banks fully control the money supply, arguing that central banks have little control, since the money supply adapts to the demand for bank credit issued by commercial banks. This is known as the theory of endogenous money, and has been advocated strongly by post-Keynesians as far back as the 1960s. It has today become a central focus of Taylor rule advocates. This position is not universally accepted – banks create money by making loans, but the aggregate volume of these loans diminishes as real interest rates increase. Thus, central banks can influence the money supply by making money cheaper or more expensive, thus increasing or decreasing its production.

A fundamental concept in inflation analysis is the relationship between inflation and unemployment, called the Phillips curve. This model suggests that there is a trade-off between price stability and employment. Therefore, some level of inflation could be considered desirable in order to minimize unemployment. The Phillips curve model described the U.S. experience well in the 1960s but failed to describe the combination of rising inflation and economic stagnation (sometimes referred to as stagflation) experienced in the 1970s.

Thus, modern macroeconomics describes inflation using a Phillips curve that *shifts* (so the trade-off between inflation and unemployment changes) because of such matters as supply shocks and inflation becoming built into the normal workings of the economy. The former refers to such events as the oil shocks of the 1970s, while the latter refers to the price/wage spiral and inflationary expectations implying that the economy "normally" suffers from inflation. Thus, the Phillips curve represents only the demand-pull component of the triangle model.

Another concept of note is the potential output (sometimes called the "natural gross domestic product"), a level of GDP, where the economy is at its optimal level of production given institutional and natural constraints. (This level of output corresponds to

the Non-Accelerating Inflation Rate of Unemployment, NAIRU, or the "natural" rate of unemployment or the full-employment unemployment rate.) If GDP exceeds its potential (and unemployment is below the NAIRU), the theory says that inflation will *accelerate* as suppliers increase their prices and built-in inflation worsens. If GDP falls below its potential level (and unemployment is above the NAIRU), inflation will *decelerate* as suppliers attempt to fill excess capacity, cutting prices and undermining built-in inflation.

However, one problem with this theory for policy-making purposes is that the exact level of potential output (and of the NAIRU) is generally unknown and tends to change over time. Inflation also seems to act in an asymmetric way, rising more quickly than it falls. Worse, it can change because of policy: for example, high unemployment under British Prime Minister Margaret Thatcher might have led to a rise in the NAIRU (and a fall in potential) because many of the unemployed found themselves as structurally unemployed (also see unemployment), unable to find jobs that fit their skills. A rise in structural unemployment implies that a smaller percentage of the labor force can find jobs at the NAIRU, where the economy avoids crossing the threshold into the realm of accelerating inflation.

2.4 MONETARIST VIEW

Monetarists believe the most significant factor influencing inflation or deflation is the management of money supply through the easing or tightening of credit. They consider fiscal policy, or government spending and taxation, as ineffective in controlling inflation. According to the famous monetarist economist Milton Friedman, "*Inflation is always and everywhere a monetary phenomenon.*"

Monetarists assert that the empirical study of monetary history shows that inflation has always been a monetary phenomenon. The quantity theory of money, simply stated, says that the total amount of spending in an economy is primarily determined by the total amount of money in existence. This theory begins with the identity:

$$M \cdot V = P \cdot Q$$

where

M is the quantity of money.

V is the velocity of money in final expenditures;

P is the general price level;

Q is an index of the real value of final expenditures;

In this formula, the general price level is affected by the level of economic activity (Q), the quantity of money (M) and the velocity of money (V). The formula is an identity because the velocity of money (V) is defined to be the ratio of final expenditure ($P \cdot Q$) to the quantity of money (M).

Velocity of money is often assumed to be constant, and the real value of output is determined in the long run by the productive capacity of the economy. Under these assumptions, the primary driver of the change in the general price level is changes in the quantity of money. With constant velocity, the money supply determines the value of nominal output (which equals final expenditure) in the short run. In practice, velocity is not constant, and can only be measured indirectly and so the formula does not necessarily imply a stable relationship between money supply and nominal output. However, in the long run, changes in money supply and level of economic activity usually dwarf changes in velocity. If velocity is relatively constant, the long run rate of increase in prices (inflation) is equal to the difference between the long run growth rate of money supply and the long run growth rate of real output.

'Inflation to me is the net result of sophisticated dynamic interactions of four groups of explanatory factors: Demand side (or monetary shocks); supply side(or real shocks), inertial factors and political processes(role of institutions); that is to say, inflation is always and everywhere a macroeconomic and institutional phenomenon'- Polodoo (2005)

2.5 STRUCTURALIST APPROACH

Inertial inflation is a concept coined by structuralist inflation theorists. It refers to a situation where all prices in an economy are continuously adjusted with relation to a price index by force of contracts.

Changes in price indices trigger changes in prices of goods. Contracts are made to accommodate this price-changing scenario by means of indexation. Indexation in a high-inflation economy is evident when, for instance, a given price must be recalculated at a

later date, incorporating inflation accumulated over the period to "correct" the price. In other cases, local currency prices can be expressed in terms of a foreign currency. In some point in the future, prices are converted back from the foreign currency equivalent into local currency. This conversion from a "stronger" currency equivalent value (ie, the foreign currency) is intended to protect the real value of goods, as the nominal value depreciates.

In the medium-to-long term, economic agents begin to forecast inflation and to use those forecasts as de facto price indexes that can trigger price adjustments before the actual price indices are made known to the public. This cycle of forecast-price adjustment-forecast closes itself in the form of a feedback loop and inflation indices get beyond control since current inflation becomes the basis for future inflation (more formally, economic agents start to adjust prices solely based on their expectations of future inflation). At worst, inflation tends to grow exponentially (leading to hyperinflation)

Some other approaches to inflation are being discussed here in next sections.

2.5.1 Rational expectations theory

Rational expectations theory holds that economic actors look rationally into the future when trying to maximize their well-being, and do not respond solely to immediate opportunity costs and pressures. In this view, while generally grounded in monetarism, future expectations and strategies are important for inflation as well.

A core assertion of rational expectations theory is that actors will seek to "head off" central-bank decisions by acting in ways that fulfill predictions of higher inflation. This means that central banks must establish their credibility in fighting inflation, or have economic actors make bets that the economy will expand, believing that the central bank will expand the money supply rather than allow a recession.

2.5.2 Austrian theory

The Austrian School asserts that inflation is an increase in the money supply, rising prices are merely consequences and this semantic difference is important in defining inflation. Austrian economists believe there is no material difference between the concepts of monetary inflation and general price inflation. Austrian economists

measure monetary inflation by calculating the growth of new units of money that are available for immediate use in exchange, that have been created over time. This interpretation of inflation implies that inflation is always a distinct action taken by the central government or its central bank, which permits or allows an increase in the money supply. In addition to state-induced monetary expansion, the Austrian School also maintains that the effects of increasing the money supply are magnified by credit expansion, as a result of the fractional-reserve banking system employed in most economic and financial systems in the world.

Austrians argue that the state uses inflation as one of the three means by which it can fund its activities (inflation tax), the other two being taxation and borrowing. Various forms of military spending is often cited as a reason for resorting to inflation and borrowing, as this can be a short term way of acquiring marketable resources and is often favored by desperate, indebted governments.

In other cases, Austrians argue that the government actually creates economic recessions and depressions, by creating artificial booms that distort the structure of production. The central bank may try to avoid or defer the widespread bankruptcies and insolvencies which cause economic recessions or depressions by artificially trying to "stimulate" the economy through "encouraging" money supply growth and further borrowing via artificially low interest rates. Accordingly, many Austrian economists support the abolition of the central banks and the fractional-reserve banking system, and advocate returning to a 100 percent gold standard, or less frequently, free banking. They argue this would constrain unsustainable and volatile fractional-reserve banking practices, ensuring that money supply growth (and inflation) would never spiral out of control.

2.5.3 Real bills doctrine

Within the context of a fixed specie basis for money, one important controversy was between the quantity theory of money and the real bills doctrine (RBD). Within this context, quantity theory applies to the level of fractional reserve accounting allowed against specie, generally gold, held by a bank. Currency and banking schools of economics argue the RBD, that banks should also be able to issue currency against bills of trading, which is "real bills" that they buy from merchants. This theory was important

in the 19th century in debates between "Banking" and "Currency" schools of monetary soundness, and in the formation of the Federal Reserve. In the wake of the collapse of the international gold standard post 1913, and the move towards deficit financing of government, RBD has remained a minor topic, primarily of interest in limited contexts, such as currency boards. It is generally held in ill repute today, with Frederic Mishkin, a governor of the Federal Reserve going so far as to say it had been "completely discredited." Even so, it has theoretical support from a few economists, particularly those that see restrictions on a particular class of credit as incompatible with libertarian principles of laissez-faire, even though almost all libertarian economists are opposed to the RBD.

The debate between currency, or quantity theory, and banking schools in Britain during the 19th century prefigures current questions about the credibility of money in the present. In the 19th century the banking school had greater influence in policy in the United States and Great Britain, while the currency school had more influence "on the continent", that is in non-British countries, particularly in the Latin Monetary Union and the earlier Scandinavia monetary union.

2.5.4 Anti-classical or backing theory

Another issue associated with classical political economy is the anti-classical hypothesis of money, or "backing theory". The backing theory argues that the value of money is determined by the assets and liabilities of the issuing agency. Unlike the Quantity Theory of classical political economy, the backing theory argues that issuing authorities can issue money without causing inflation so long as the money issuer has sufficient assets to cover redemptions. There are very few backing theorists, making quantity theory the dominant theory explaining inflation.

2.6 PHILIPS CURVE ANALYSIS

In economics, the Phillips curve is a historical inverse relationship between the rate of unemployment and the rate of inflation in an economy. Stated simply, the lower the unemployment in an economy, the higher the rate of increase in nominal wages. While it has been observed that there is a stable short run tradeoff between unemployment and inflation this has not been observed in the long run.

In the 1970s, many countries experienced high levels of both inflation and unemployment also known as stagflation. Theories based on the Phillips curve suggested that this could not happen, and the curve came under concerted attack from a group of economists headed by Milton Friedman—arguing that the demonstrable failure of the relationship demanded a return to non-interventionist, free market policies. The idea that there was one simple, predictable, and persistent relationship between inflation and unemployment was, at least, questioned.

2.6.1 NAIRU and rational expectations

New theories, such as rational expectations and the NAIRU (non-accelerating inflation rate of unemployment) arose to explain how stagflation could occur. The latter theory, also known as the "natural rate of unemployment", distinguished between the "short-term" Phillips curve and the "long-term" one. The short-term Phillips Curve looked like a normal Phillips Curve, but shifted in the long run as expectations changed. In the long run, only a single rate of unemployment (the NAIRU or "natural" rate) was consistent with a stable inflation rate. The long-run Phillips Curve was thus vertical, so there was no trade-off between inflation and unemployment. Edmund Phelps won the Nobel Prize in Economics in 2006 for this.

In the diagram, the long-run Phillips curve is the vertical red line. The NAIRU theory says that when unemployment is at the rate defined by this line, inflation will be stable. However, in the short-run policymakers will face an inflation-unemployment rate tradeoff marked by the "Initial Short-Run Phillips Curve" in the graph. Policymakers can therefore reduce the unemployment rate temporarily, moving from point A to point B through expansionary policy. However, according to the NAIRU, exploiting this short-run tradeoff will raise inflation expectations, shifting the short-run curve rightward to the "New Short-Run Phillips Curve" and moving the point of equilibrium from B to C. Thus the reduction in unemployment below the "Natural Rate" will be temporary, and lead only to higher inflation in the long run.

Since the short-run curve shifts outward due to the attempt to reduce unemployment, the expansionary policy ultimately worsens the exploitable tradeoff between unemployment and inflation. That is, it results in more inflation at each short-run unemployment rate. The name "NAIRU" arises because with actual unemployment

below it, inflation accelerates, while with unemployment above it, inflation decelerates. With the actual rate equal to it, inflation is stable, neither accelerating nor decelerating. One practical use of this model was to provide an explanation for stagflation, which confounded the traditional Phillips curve.

The rational expectations theory said that expectations of inflation were equal to what actually happened, with some minor and temporary errors. This in turn suggested that the short-run period was so short that it was non-existent: any effort to reduce unemployment below the NAIRU, for example, would *immediately* cause inflationary expectations to rise and thus imply that the policy would fail. Unemployment would never deviate from the NAIRU except due to random and transitory mistakes in developing expectations about future inflation rates. In this perspective, any deviation of the actual unemployment rate from the NAIRU was an illusion.

However, in the 1990s in the U.S., it became increasingly clear that the NAIRU did not have a unique equilibrium and could change in unpredictable ways. In the late 1990s, the actual unemployment rate fell below 4 % of the labor force, much lower than almost all estimates of the NAIRU. But inflation stayed very moderate rather than accelerating. So, just as the Phillips curve had become a subject of debate, so did the NAIRU.

Furthermore, the concept of rational expectations had become subject to much doubt when it became clear that the main assumption of models based on it was that there exists a single (unique) equilibrium in the economy that is set ahead of time, determined independently of demand conditions. The experience of the 1990s suggests that this assumption cannot be sustained.

2.6.2 The Phillips curve today

Most economists no longer use the Phillips curve in its original form because it was shown to be too simplistic. This can be seen in a cursory analysis of US inflation and unemployment data 1953-92. There is no single curve that will fit the data, but there are three rough aggregations—1955-71, 1974-84, and 1985-92—each of which shows a general, downwards slope, but at three very different levels with the shifts occurring abruptly. The data for 1953-54 and 1972-73 do not group easily, and a more formal analysis posits up to five groups/curves over the period.

But still today, modified forms of the Phillips Curve that take inflationary expectations into account remain influential. The theory goes under several names, with some variation in its details, but all modern versions distinguish between short-run and long-run effects on unemployment. The "short-run Phillips curve" is also called the "expectations-augmented Phillips curve", since it shifts up when inflationary expectations rise, Edmund Phelps and Milton Friedman argued. In the long run, this implies that monetary policy cannot affect unemployment, which adjusts back to its "natural rate", also called the "NAIRU" or "long-run Phillips curve". However, this long-run "neutrality" of monetary policy does allow for short run fluctuations and the ability of the monetary authority to temporarily decrease unemployment by increasing permanent inflation, and vice versa. Blanchard (2000, chapter 8) gives a textbook presentation of the expectations-augmented Phillips curve.

An equation like the expectations-augmented Phillips curve also appears in many recent New Keynesian dynamic stochastic general equilibrium models. In these macroeconomic models with sticky prices, there is a positive relation between the rate of inflation and the level of demand, and therefore a negative relation between the rate of inflation and the rate of unemployment. This relationship is often called the "New Keynesian Phillips curve." Like the expectations-augmented Phillips curve, the New Keynesian Phillips curve implies that increased inflation can lower unemployment temporarily, but cannot lower it permanently. Two influential papers that incorporate a New Keynesian Phillips curve are Clarida, Gali, and Gertler (1999) and Blanchard and Gali (2007).

2.6.3 Gordon's triangle model

Robert J. Gordon of Northwestern University has analysed the Phillips curve to produce what he calls the triangle model, in which the actual inflation rate is determined by the sum of

1. demand pull or short-term Phillips curve inflation,
2. cost push or supply shocks, and
3. built-in inflation.

The last reflects inflationary expectations and the price/wage spiral. Supply shocks and changes in built-in inflation are the main factors shifting the short-run Phillips

Curve and changing the trade-off. In this theory, it is not only inflationary expectations that can cause stagflation. For example, the steep climb of oil prices during the 1970s could have this result.

Changes in built-in inflation follow the partial-adjustment logic behind most theories of the NAIRU:

1. Low unemployment encourages high inflation, as with the simple Phillips curve. But if unemployment stays low and inflation stays high *for a long time*, as in the late 1960s in the U.S., both inflationary expectations and the price/wage spiral accelerate. This *shifts* the short-run Phillips curve upward and rightward, so that more inflation is seen at any given unemployment rate. (This is with shift B in the diagram.)
2. High unemployment encourages low inflation, again as with a simple Phillips curve. But if unemployment stays high and inflation stays low for a long time, as in the early 1980s in the U.S., both inflationary expectations and the price/wage spiral slow. This *shifts* the short-run Phillips curve downward and leftward, so that less inflation is seen at each unemployment rate.

In between these two lies the NAIRU, where the Phillips curve does not have any inherent tendency to shift, so that the inflation rate is stable. However, there seems to be a range in the middle between "high" and "low" where built-in inflation stays stable. The ends of this "non-accelerating inflation range of unemployment rates" change over time.

2.6.4 Mathematics behind the Phillips curve

There are at least two different mathematical derivations of the Phillips curve. First, there is the traditional or Keynesian version. Then, there is the new Classical version associated with Robert E. Lucas, Jr.

The traditional Phillips curve

The original Phillips curve literature was not based on the unaided application of economic theory. Instead, it was based on empirical generalizations. After that, economists tried to develop theories that fit the data.

Money wage determination

The traditional Phillips curve story starts with a wage Phillips Curve, of the sort described by A.W. Phillips himself. This describes the rate of growth of money wages (gW). Here and below, the operator g is the equivalent of "the percentage rate of growth of" the variable that follows.

$$gW = gW^T - f(U)$$

The "money wage rate" (W) is short-hand for total money wage costs per production employee, including benefits and payroll taxes. The focus is on only production workers' money wages, because (as discussed below) these costs are crucial to pricing decisions by the firms.

This equation tells us that the growth of money wages rises with the trend rate of growth of money wages (indicated by the superscript "T") and falls with the unemployment rate (U). The function $f()$ is assumed to be monotonically increasing with U so that the dampening of money-wage increases by unemployment is shown by the negative sign in the equation above.

There are several possible stories behind this equation. A major one is that money wages are set by *bilateral negotiations* under partial bilateral monopoly: as the unemployment rate rises, *all else constant* worker bargaining power falls, so that workers are less able to increase their wages in the face of employer resistance.

During the 1970s, this story had to be modified, because (as the late Abba Lerner had suggested in the 1940s) workers try to keep up with inflation. Since the 1970s, the equation has been changed to introduce the role of inflationary expectations (or the expected inflation rate, gP^{ex}). This produces the expectations-augmented wage Phillips curve:

$$gW = gW^T - f(U) + \lambda * gP^{ex}$$

The introduction of inflationary expectations into the equation implies that actual inflation can *feed back* into inflationary expectations and thus cause further inflation. The late economist James Tobin dubbed the last term "inflationary inertia," because in the current period, inflation exists which represents an inflationary impulse left over from the past.

It also involved much more than expectations, including the price-wage spiral. In this spiral, employers try to protect profits by raising their prices and employees try to keep up with inflation to protect their real wages. This process can feed on itself, becoming a self-fulfilling prophecy.

The parameter λ (which is presumed constant during any time period) represents the degree to which employees can gain money wage increases to keep up with expected inflation, preventing a fall in expected real wages. It is usually assumed that this parameter equals unity in the long run.

In addition, the function $f()$ was modified to introduce the idea of the Non-Accelerating Inflation Rate of Unemployment (NAIRU) or what's sometimes called the "natural" rate of unemployment or the inflation-threshold unemployment rate:

$$[1] \ gW = gW^T - f(U - U^*) + \lambda \cdot gP^{ex}.$$

Here, U^* is the NAIRU. As discussed below, if $U < U^*$, inflation tends to accelerate. Similarly, if $U > U^*$, inflation tends to slow. It is assumed that $f(0) = 0$, so that when $U = U^*$, the f term drops out of the equation.

In equation [1], the roles of gW^T and gP^{ex} seem to be redundant, playing much the same role. However, assuming that λ is equal to unity, it can be seen that they are not. If the trend rate of growth of money wages equals zero, then the case where U equals U^* implies that gW equals expected inflation. That is, expected real wages are constant.

In any reasonable economy, however, having constant expected real wages could only be consistent with actual real wages that are constant over the long haul. This does not fit with economic experience in the U.S. or any other major industrial country. Even though real wages have not risen much in recent years, there have been important increases over the decades.

An alternative is to assume that the trend rate of growth of money wages equals the trend rate of growth of average labor productivity (Z). That is:

$$[2] \ gW^T = gZ^T.$$

Under assumption [2], when U equals U^* and λ equals unity, expected real wages would increase with labor productivity. This would be consistent with an economy in which actual real wages increase with labor productivity. Deviations of real-wage trends

from those of labor productivity might be explained by reference to other variables in the model.

Pricing decisions

Next, there is price behavior. The standard assumption is that markets are *imperfectly competitive*, where most businesses have some power to set prices. So the model assumes that the average business sets prices as a mark-up (**M**) over unit labor costs in production measured at a standard rate of capacity utilization (say, at 90 percent use of plant and equipment) and then add in unit material costs.

The standardization involves later ignoring deviations from the trend in labor productivity. For example, assume that the growth of labor productivity is the same as that in the trend and that current productivity equals its trend value:

$$gZ = gZ^T \text{ and } Z = Z^T.$$

The markup reflects both the firm's degree of market power and the extent to which overhead costs have to be paid. Put another way, all else equal, **M** rises with the firm's power to set prices or with a rise of overhead costs relative to total costs.

So pricing follows this equation:

$$\begin{aligned} P &= M \times (\text{unit labor costs}) + (\text{unit materials cost}) \\ &= M \times (\text{total production employment cost}) / (\text{quantity of output}) + \text{UMC}. \end{aligned}$$

UMC is unit raw materials cost (total raw materials costs divided by total output).

So the equation can be restated as:

$$P = M \times (\text{production employment cost per worker}) / (\text{output per production employee}) + \text{UMC}.$$

This equation can again be stated as:

$$\begin{aligned} P &= M \times (\text{average money wage}) / (\text{production labor productivity}) + \text{UMC} \\ &= M \times (W/Z) + \text{UMC}. \end{aligned}$$

Now, assume that both the average price/cost mark-up (**M**) and UMC are constant. On the other hand, labor productivity grows, as before. Thus, an equation determining the price inflation rate (**gP**) is:

$$gP = gW - gZ^T.$$

The price Phillips curves

Then, combined with the wage Phillips curve [equation 1] and the assumption made above about the trend behavior of money wages [equation 2], this price-inflation equation gives us a simple expectations-augmented price Phillips curve:

$$gP = -f(U - U^*) + \lambda \cdot gP^{ex}.$$

Some assume that we can simply add in $gUMC$, the rate of growth of UMC , in order to represent the role of supply shocks (of the sort that plagued the U.S. during the 1970s). This produces a standard short-term Phillips curve:

$$gP = -f(U - U^*) + \lambda \cdot gP^{ex} + gUMC.$$

Economist Robert J. Gordon has called this the "Triangle Model" because it explains short-run inflationary behavior by three factors: demand inflation (due to low unemployment), supply-shock inflation ($gUMC$), and inflationary expectations or inertial inflation.

In the *long run*, it is assumed, inflationary expectations catch up with and equal actual inflation so that $gP = gP^{ex}$. This represents the long-term equilibrium of expectations adjustment. Part of this adjustment may involve the adaptation of expectations to the experience with actual inflation. Another might involve guesses made by people in the economy based on other evidence. (The latter idea gave us the notion of so-called rational expectations.)

Expectational equilibrium gives us the long-term Phillips curve. First, with λ less than unity:

$$gP = [1/(1 - \lambda)] \cdot (-f(U - U^*) + gUMC).$$

This is nothing but a steeper version of the short-run Phillips curve above. Inflation rises as unemployment falls, while this connection is stronger. That is, a low unemployment rate (less than U^*) will be associated with a higher inflation rate in the long run than in the short run. This occurs because the actual higher-inflation situation seen in the short run feeds back to raise inflationary expectations, which in turn raises the inflation rate further. Similarly, at high unemployment rates (greater than U^*) lead to low inflation rates. These in turn encourage lower inflationary expectations, so that inflation itself drops again.

This logic goes further if λ is equal to unity, i.e., if workers are able to protect their wages *completely* from expected inflation, even in the short run. Now, the Triangle Model equation becomes:

$$-f(U - U^*) = gUMC.$$

If we further assume (as seems reasonable) that there are no long-term supply shocks, this can be simplified to become:

$$-f(U - U^*) = 0 \text{ which implies that } U = U^*.$$

All of the assumptions imply that in the long run, there is only one possible unemployment rate, U^* at any one time. This uniqueness explains why some call this unemployment rate "natural."

To truly understand and criticize the uniqueness of U^* , a more sophisticated and realistic model is needed. For example, we might introduce the idea that workers in different sectors push for money wage increases that are similar to those in other sectors. Or we might make the model even more realistic. One important place to look is at the determination of the mark-up, M .

New classical version

The Phillips curve equation can be derived from the (short-run) Lucas aggregate supply function. The Lucas approach is very different from that the traditional view. Instead of starting with empirical data, he started with a classical economic model following very simple economic principles.

Start with the aggregate supply function:

$$Y = Y_n + a(P - P_e)$$

where Y is log value of the actual output, Y_n is log value of the "natural" level of output, a is a positive constant, P is log value of the actual price level, and P_e is log value of the expected price level. Lucas assumes that Y_n has a unique value.

Note that this equation indicates that when expectations of future inflation (or, more correctly, the future price level) are *totally accurate*, the last term drops out, so that actual output equals the so-called "natural" level of real GDP. This means that in the Lucas aggregate supply curve, the *only* reason why actual real GDP should deviate from potential—and the actual unemployment rate should deviate from the "natural" rate—is because of *incorrect expectations* of what is going to happen with prices in the future.

(The idea has been expressed first by Keynes, "General Theory," Chapter 20 section III paragraph 4).

This differs from other views of the Phillips curve, in which the failure to attain the "natural" level of output can be due to the imperfection or incompleteness of markets, the stickiness of prices, and the like. In the non-Lucas view, incorrect expectations can contribute to aggregate demand failure, but they are not the only cause. To the "new Classical" followers of Lucas, markets are presumed to be perfect and always attain equilibrium (given inflationary expectations).

We re-arrange the equation into:

$$P = P_e + \frac{Y - Y_n}{a}$$

Next we add unexpected exogenous shocks to the world supply v :

$$P = P_e + \frac{Y - Y_n}{a} + v$$

Subtracting last year's price levels P_{-1} will give us inflation rates, because

$$P - P_{-1} \approx \pi$$

and

$$P_e - P_{-1} \approx \pi_e$$

where π and π_e are the inflation and expected inflation respectively.

There is also a negative relationship between output and unemployment (as expressed by Okun's law). Therefore using

$$\frac{Y - Y_n}{a} = -b(U - U_n)$$

where b is a positive constant, U is unemployment, and U_n is the natural rate of unemployment or NAIRU, we arrive at the final form of the short-run Phillips curve:

$$\pi = \pi_e - b(U - U_n) + v$$

This equation, plotting inflation rate π against unemployment U gives the downward-sloping curve in the diagram that characterizes the Phillips curve.

2.7 SAMUELSON AND SOLOW'S APPROACH

As this model says, it is not possible on the basis of a priori reasoning to reject either the demand-pull or cost-push hypothesis, or the variants of the latter such as

demand-shift. UTe have also argued that the empirical identifications needed to distinguish between these hypotheses may be quite impossible from the experience of macro data that is available to us; and that, while use of microdot might throw additional light on the problem; even here identification is fraught with difficulties and ambiguities. Nevertheless, there is one area where policy interest and the desire for scientific understanding for its own sake come together. If by deliberate policy one engineered a sizable reduction of demand or refused to permit the increase in demand that would be needed to preserve high employment, one would have an experiment that could hope to distinguish between the validity of the demand-pull and the cost-push theory as we would operationally reformulate those theories. If a small relaxation of demand were followed by great moderations in the march of wages and other costs so that the social cost of a stable price index turned out to be very small in terms of sacrificed high-level employment and output, then the demand-pull hypothesis would have received its most important confirmation.

On the other hand, if mild demand repression checked cost and price increases not at all or only mildly, so that considerable unemployment would have to be engineered before the price level up drift could be prevented, then the cost-push hypothesis would have received its most important confirmation. If the outcome of this experience turned out to be in between these extreme cases-as we ourselves would rather expect-then an element of validity would have to be conceded to both views; and dull as it is to have to embrace eclectic theories, scholars who wished to be realistic would have to steel themselves to doing so.

Of course, we have been talking glibly of a vast experiment. Actually such an operation would be fraught with implications for in demand-pull ought to welcome such an experiment. But, equally naturally, the believers in cost-push would be dead set against such an engineered low-pressure economy, since they are equally convinced that it will be a dismal failure involving much needless social pain. (A third school, who believes in cost-push but think it can be cured or minimized by orthodox depressing of demand, think that our failure to make this experiment would be fraught with social evil by virtue of the fact that they expect a creep in prices to snowball into a trot and then a the Phillips' diagram showing the American pattern of wage increase against degree of

unemployment into a related diagram showing the different levels of unemployment that would be "needed" for each degree of price level change, we come out with guesses like the following:

1. In order to have wages increase at no more than the 2 s per cent per annum characteristic of our productivity growth, the American economy would seem on the basis of twentieth-century and postwar experience to have to undergo something like 5 to 6 per cent of the civilian labor force's being unemployed. That much unemployment would appear to be the cost of price stability in the years immediately ahead.
2. In order to achieve the nonperfectionist's goal of high enough output to give us no more than 3 per cent unemployment, the price index might have to rise by as much as 4 to 5 per cent per year. That much price rise would seem to be the necessary cost of high employment and production in the years immediately ahead. All this is shown in our price-level modification of the Phillips curve see the figure below. The point A, corresponding to price stability, is seen to involve about 5% per cent unemployment; whereas the point B, corresponding to 3 per cent unemployment, is seen to involve a price rise of about 4% per cent per annum. We rather expect that the tug of war of politics will end us up in the next few years somewhere in between these selected points. We shall probably have some price rise and some excess unemployment.

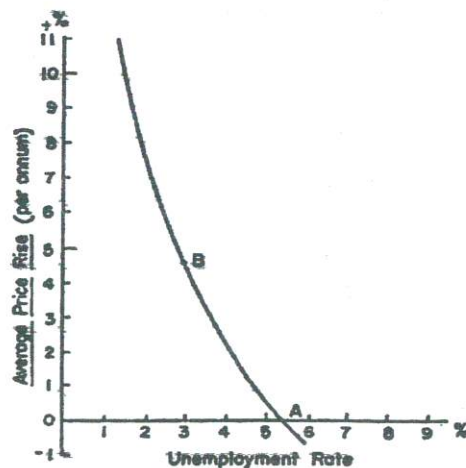


Figure 1

Aside from the usual warning that these are simply our best guesses we must give another caution. All of our discussion has been phrased in short-run terms, dealing with what might happen in the next few years. It would be wrong, though, to think that our Figure menu that relates obtainable price and unemployment behavior will maintain its same shape in the longer run. What we do in a policy way during the next few years might cause it to shift in a definite way. Thus, it is conceivable that after they had produced a low-pressure economy, the believers in demand-pull might be disappointed in the short run; i.e., prices might continue to rise even though unemployment was considerable. Nevertheless, it might be that the low-pressure demand would so act upon wage and other expectations as to shift the curve downward in the longer run-so that over a decade, the economy might enjoy higher employment with price stability than our present-day estimate would indicate.

But also the opposite is conceivable. A low-pressure economy might build up within itself over the years larger and larger amounts of structural unemployment (the reverse of what happened from 1941 to 1953 as a result of strong war and postwar demands). The result would be an upward shift of our menu of choice, with more and more unemployment being needed just to keep prices stable. Since we have no conclusive or suggestive evidence on these conflicting issues, we shall not attempt to give judgment on them. Instead we venture the reminder that, in the years just ahead, the level of attained growth will be highly correlated with the degree of full employment and high-capacity output.

But what about the longer run? If the per annum rate of technical progress were about the same in a low- and high-pressure economy, then the initial loss in output in going to the low-pressure state would never be made up; however, in relative terms, the initial gap would not grow but would remain constant as time goes by. If a low-pressure economy could succeed in improving the efficiency of our productive factors, some of the loss of growth might be gradually made up and could in long enough time even be more than wiped out. On the other hand, if such an economy produced class warfare and social conflict and depressed the level of research and technical progress, the loss in growth would be compounded the long run.

2.8 NATURAL RATE OF UNEMPLOYMENT

The natural rate of unemployment (sometimes called the structural unemployment rate) is a concept of economic activity developed in particular by Milton Friedman and Edmund Phelps in the 1960s, both recipients of the Nobel prize in economics. In both cases, the development of the concept is cited as a main motivation behind the prize. It represents the hypothetical unemployment rate consistent with aggregate production being at the "long-run" level. This level is consistent with aggregate production in the absence of various temporary frictions such as incomplete price adjustment in labor and goods markets. The natural rate of unemployment therefore corresponds to the unemployment rate prevailing under a classical view of determination of activity. It is mainly determined by the economy's supply side, and hence production possibilities and economic institutions. If these institutional features involve permanent mismatches in the labor market or real wage rigidities, the natural rate of unemployment may feature involuntary unemployment.

Occurrence of disturbances (e.g., cyclical shifts in investment sentiments) will cause actual unemployment to continuously deviate from the natural rate, and be partly determined by aggregate demand factors as under a Keynesian view of output determination. The policy implication is that the natural rate of unemployment cannot permanently be reduced by demand management policies (including monetary policy), but that such policies can play a role in stabilizing variations in actual unemployment. Reductions in the natural rate of unemployment must, according to the concept, be achieved through structural policies directed towards an economy's supply side.

2.8.1 The natural rate of unemployment and the Phillips curve

The development of the theory of the natural rate of unemployment came in the 1960s where economists observed that the Phillips-curve relationship between inflation and unemployment began to break down. Until then, it was widely believed that a stable negative relation between inflation and unemployment existed. This belief had the policy implication that unemployment could be permanently reduced by expansive demand policy and thus higher inflation.

Friedman and Phelps opposed this idea on theoretical grounds, as they noted that if unemployment was to be permanently lower, some real variable in the economy, like the real wage, would have changed permanently. Why this should be the case because inflation was higher, appeared to rely on systematic irrationality in the labor market. As Friedman remarked, wage inflation would eventually catch up and leave the real wage, and unemployment, unchanged. Hence, lower unemployment could only be attained as long as wage inflation and inflation expectations lagged behind actual inflation. This was seen to be only a temporary outcome. Eventually, unemployment would return to the rate determined by real factors independent of the inflation rate. According to Friedman and Phelps, the Phillips curve was therefore vertical in the long run, and expansive demand policies would only be a cause of inflation, not a cause of permanently lower unemployment.

Milton Friedman emphasized expectations errors as the main cause of deviation in unemployment from the natural rate, whereas Edmund Phelps focused more in detail on the labor market structures and frictions that would cause aggregate demand changes to feed into inflation, and for sluggish expectations, into the determination of the unemployment rate. Also, his theories gave insights into the causes of a too high natural rate of unemployment (i.e., why unemployment could be structural or classical

2.8.2 Differences between the Natural Rate of Unemployment and the NAIRU

Natural Rate of Unemployment & NAIRU

- Natural rate of Unemployment is the unemployment which occurs when the labour market is in equilibrium. It is supply side unemployment, such as frictional and structural unemployment.
- If unemployment is reduced below the natural rate, there is risk of inflation occurring. This is because to reduce the rate of unemployment below the natural rate of unemployment requires an increase in demand and economic growth.

Monetarists use a slightly different concept called the NAIRU. • NAIRU The non accelerating inflation rate of unemployment is that unemployment rate consistent with a constant inflation rate. At the NAIRU the upward and downward forces on price and

wage inflation are in balance, so there is no tendency for inflation to change. It is the lowest unemployment rate which can be sustained without upward pressure on inflation. • Monetarist argues that reducing unemployment below the NAIRU will only cause inflation and the fall in unemployment will be temporary. Therefore, to keep unemployment below this natural rate requires an ever increasing rate of inflation.

Reducing the Natural rate of unemployment or NAIRU involves the use of supply side policies and increased productivity. This reduction in unemployment will not cause inflation and will be permanent.

2.9 TOBIN'S MODIFIED PHILLIPS CURVE

The Phillips curve is a central component of macroeconomics, providing a structural equation that determines the rate of inflation as a function of the rate of unemployment. It is also central for policymaking since it constitutes a critical constraint on policy. If policymakers choose to stimulate economic activity, ultimate outcomes are constrained to lie on the Phillips curve which determines the set of sustainable inflation – unemployment outcomes. There is no lasting unemployment - inflation trade-off if the long-run Phillips curve is vertical.

Tobin's alternative program was abandoned because it is logically incompatible with macro models that have a single aggregate labor market, and instead requires adoption of multi-sector labor markets. This gave the Friedman – Phelps approach a big advantage since it was compatible with single good – single labor market macro models that macroeconomists are familiar with and which are also easier to use. Explaining the Phillips curve by reference to expectation formation dramatically twists the economic welfare and policy implications of Phillips curve theory.

As long as the Phillips curve is explained by reference to formation of inflation expectations, it will remain in the orbit of natural rate thinking where there is no welfare justification for monetary policy aimed at reducing unemployment. In contrast, explaining the Phillips curve by reference to incorporation of inflation expectations breaks that orbit and provides a welfare economics rationale for Keynesian activist policies that reduce unemployment at the cost of higher inflation. Tobin (1971a, 1971b) suggested another approach to explaining the Phillips curve that identified the critical

issue as incorporation of inflation expectations rather the formation of inflation expectations. Unfortunately, Tobin never developed a deeper theoretical account of this alternative approach. A simplified version of Tobin's model is given by the following two equations:

$$(3.1) \quad w = f(u - u^*) + \lambda \pi^e \quad 0 < \lambda < 1, f' < 0, f'' < 0$$

$$(3.2) \quad \pi = w$$

Substituting (3.2) into (3.1) then yields a short-run Phillips curve given by

$$(3.3) \quad \pi = f(u - u^*) + \lambda \pi^e$$

Applying the long run equilibrium condition that expected inflation equal actual inflation

($\pi^e = \pi$) yields a long-run Phillips curve given by (3.4) $\pi = f(u - u^*)/[1 - \lambda]$. The slope of this long-run Phillips curve is given by $d\pi/du = f'/[1 - \lambda] < 0$. The long run Phillips curve is therefore negatively sloped and there exists a permanent trade-off between inflation and unemployment. As with the Friedman - Phelps model, if inflation expectations are formed adaptively there is a family of short-run Phillips curves, each indexed by the level of inflation expectations. There is also a long-run negatively sloped Phillips curve that is steeper than the short-run Phillips curve ($d\pi/du|_{LR} = f'/[1 - \lambda] < d\pi/du|_{SR} = f' < 0$). Once again the long-run Phillips curve crosses each short-run Phillips curve at the point where actual inflation equals expected inflation ($\pi = \pi^e$).

One critical feature is that the long-run negatively sloped Phillips curve holds regardless of whether inflation expectations are formed adaptively or rationally. If inflation expectations are formed rationally then agents have perfect foresight given the non-stochastic nature of the model. That means expected inflation equals actual inflation at all times ($\pi^e = \pi$) so that agents are always on the long-run Phillips curve (i.e. there is no family of short-run Phillips curves and the long- and short-run Phillips curves are one).

However, the long-run Phillips curve remains negatively sloped. This shows that formation of inflation expectations is not the critical question when it comes to the Phillips curve. Analytically, the key feature of Tobin's neo-Keynesian Phillips curve is that the coefficient of inflation expectations in equation (3.1) is less than unity ($\lambda < 1$).

That means incorporation of inflation expectations into nominal wage-setting is less than complete, and it is this rather than the formation of inflation expectations that is critical

for the existence of a Phillips trade-off. In this regard, there is a long history of empirical support for the proposition that the coefficient of inflation expectations is less than unity. Tobin (1971b, p.26) writes: "The most important empirical finding is that α_1 , the coefficient of feedback of price inflation on to wages, is significantly less than one." That finding has been reaffirmed by Brainard and Perry (2000), though they also report that the coefficient is variable. Thus, it was low in the 1950s and 1960s, rose in the 1970s, and has since fallen back.

This raises the theoretical question of why incorporation of inflation expectations is less than unity. The problem is it is hard to construct a justification in an aggregate labor market model. That is because according to such a model the labor market determines real wages and failure to fully incorporate inflation expectations would constitute systematic money illusion. That in turn would erode the real wage over time, causing systematic disequilibrium.

2.10 ADAPTIVE EXPECTATIONS AND RATIONAL EXPECTATIONS

2.10.1 Adaptive expectations

In economics, adaptive expectations means that people form their expectations about what will happen in the future based on what has happened in the past. For example, if inflation has been higher than expected in the past, people would revise expectations for the future.

One simple version of adaptive expectations is stated in the following equation, where p^e is the next year's rate of inflation that is currently expected; p_{-1}^e is this year's rate of inflation that was expected last year; and p is this year's actual rate of inflation:

$$p^e = p_{-1}^e + \lambda(p_{-1} - p_{-1}^e)$$

With λ is between 0 and 1, this says that current expectations of future inflation reflect past expectations and an "error-adjustment" term, in which current expectations are raised (or lowered) according to the gap between actual inflation and previous expectations. This error-adjustment is also called "*partial adjustment*."

The theory of adaptive expectations can be applied to all previous periods so that current inflationary expectations equal:

$$p^e = (1 - \lambda) \sum_{j=0}^{\infty} (\lambda^j p_j)$$

where p_j equals actual inflation j years in the past. Thus, current expected inflation reflects a weighted average of all past inflation, where the weights get smaller and smaller as we move further in the past.

Once a forecasting error is made by agents, due to a stochastic shock, they will be unable to correctly forecast the price level again even if the price level experiences no further shocks since they only ever incorporate part of their errors. The backward nature of expectation formulation and the resultant systematic errors made by agents (see Cobweb model) was unsatisfactory to economists such as John Muth, who was pivotal in the development of an alternative model of how expectations are formed, called rational expectations. This has largely replaced adaptive expectations in macroeconomic theory since its assumption of optimality of expectations is consistent with economic theory

2.10.2 Rational expectations

Rational expectations is an assumption used in many contemporary macroeconomic models, and also in other areas of contemporary economics and game theory and in other applications of rational choice theory.

The rational-expectations assumption only means that the sum of all decisions of all individuals and organizations, filtered through an endogenous set of market institutions, is not systematically wrong. A better term with fewer wrong connotations is model-consistent expectations.

Since most macroeconomic models today study decisions over many periods, the expectations of workers, consumers, and firms about future economic conditions are an essential part of the model. How to model these expectations has long been controversial, and it is well known that the macroeconomic predictions of the model may differ depending on the assumptions made about expectations (see Cobweb model). To assume rational expectations is to assume that agents' expectations are wrong at every one instance, but correct *on average* over long time periods. In other words, although the

future is not fully predictable, agents' expectations are assumed not to be systematically biased and use all relevant information in forming expectations of economic variables.

This way of modeling expectations was originally proposed by John F. Muth (1961) and later became influential when it was used by Robert E. Lucas Jr and others. Modeling expectations is crucial in all models which study how a large number of individuals, firms and organizations make choices under uncertainty. For example, negotiations between workers and firms will be influenced by the expected level of inflation, and the value of a share of stock is dependent on the expected future income from that stock.

Theory

Rational expectations theory defines this kind of expectations as being identical to the *best guess of the future* (the optimal forecast) that uses all available information. However, without further assumptions, this theory of expectations determination makes no predictions about human behavior and is empty. Thus, it is assumed that outcomes that are being forecast do not differ systematically from the market equilibrium results. As a result, rational expectations do not differ systematically or predictably from equilibrium results. That is, it assumes that people do not make systematic errors when predicting the future, and deviations from *perfect foresight* are only random. In an economic model, this is typically modeled by assuming that the expected value of a variable is equal to the expected value predicted by the model.

For example, suppose that P is the equilibrium price in a simple market, determined by supply and demand. The theory of rational expectations says that the actual price will only deviate from the expectation if there is an 'information shock' caused by information unforeseeable at the time expectations were formed. In other words ex ante the actual price is equal to its rational expectation:

$$P = P^* + \varepsilon$$

$$E[P] = P^*$$

where P^* is the rational expectation and ε is the random error term, which has an expected value of zero, and is independent of P^* .

Rational expectations theories were developed in response to perceived flaws in theories based on adaptive expectations. Under adaptive expectations, expectations of the future value of an economic variable are based on past values. For example, people would be assumed to predict inflation by looking at inflation last year and in previous years. Under adaptive expectations, if the economy suffers from constantly rising inflation rates (perhaps due to government policies), people would be assumed to always underestimate inflation. This may be regarded as unrealistic - surely rational individuals would sooner or later realise the trend and take it into account in forming their expectations? Further, models of adaptive expectations never attain equilibrium, instead only moving toward it asymptotically.

The hypothesis of rational expectations addresses this criticism by assuming that individuals take all available information into account in forming expectations. Though expectations may turn out incorrect, they will not deviate systematically from the expected values.

The rational expectations hypothesis has been used to support some radical conclusions about economic policymaking. An example is the Policy Ineffectiveness Proposition developed by Thomas Sargent and Neil Wallace. If the Federal Reserve attempts to lower unemployment through expansionary monetary policy economic agents will anticipate the effects of the change of policy and raise their expectations of future inflation accordingly. This in turn will counteract the expansionary effect of the increased money supply. All that the government can do is raise the inflation rate, not employment. This is a distinctly New Classical outcome. During the 1970s rational expectations appeared to have made previous macroeconomic theory largely obsolete, which culminated with the Lucas critique. However, rational expectations theory has been widely adopted throughout modern macroeconomics as a modelling assumption thanks to the work of New Keynesians such as Stanley Fischer.

Rational expectations theory is the basis for the efficient market hypothesis (efficient market theory). If a security's price does not reflect all the information about it, then there exist "unexploited profit opportunities": someone can buy (or sell) the security to make a profit, thus driving the price toward equilibrium. In the strongest versions of these theories, where all profit opportunities *have been exploited*, all prices in financial

markets are correct and reflect market fundamentals (such as future streams of profits and dividends). Each financial investment is as good as any other, while a security's price reflects all information about its intrinsic value.

Criticisms

The hypothesis is often criticized as an unrealistic model of how expectations are formed. First, truly rational expectations would take into account the fact that information about the future is *costly*. The "optimal forecast" may be the best not because it is accurate but because it is too expensive to attain even close to accuracy. Adherents to the Austrian School and Keynesian economics go further, pointing to the fundamental uncertainty about what will happen in the future. That is, the future *cannot* be predicted, so that *no* expectations can be truly "rational."

Further, the models of Muth and Lucas (and the strongest version of the efficient markets hypothesis) assume that at any specific time, a market or the economy has *only one* equilibrium (which was determined ahead of time), so that people form their expectations around this unique equilibrium. Muth's math (sketched above) assumed that P^* was unique. Lucas assumed that equilibrium corresponded to a unique "full employment" level (potential output) -- corresponding to a unique NAIRU or natural rate of unemployment. If there is more than a possible equilibrium at any time then the more interesting implications of the theory of rational expectations do not apply. In fact, expectations would determine the nature of the equilibrium attained, reversing the line of causation posited by rational expectations theorists.

A further problem relates to the application of the rational expectations hypothesis to aggregate behavior. It is well known that assumptions about individual behavior do not carry over to aggregate behavior (Sonnenschein-Mantel-Debreu theorem). The same holds true for rationality assumptions: Even if all individuals have rational expectations, the representative household describing these behaviors may exhibit behavior that does not satisfy rationality assumptions (Janssen 1993). Hence the rational expectations hypothesis, as applied to the representative household, is unrelated to the presence or absence of rational expectations on the micro level and lacks, in this sense, a microeconomic foundation.

It can be argued that it is difficult to apply the standard efficient market hypothesis (efficient market theory) to understand the stock market bubble that ended in 2000 and collapsed thereafter. (Advocates of Rational Expectations may say that the problem of ascertaining all the pertinent effects of the stock-market crash is a great challenge.)

Sociologists tend to criticize the theory based on philosopher Karl Popper's criterion of falsifiability. They note that many economists, upon being confronted with empirical data that goes against the "rational" theory, can simply modify their theories without ever touching the basic thesis of rational expectation. Furthermore, social scientists in general criticize the movement of this theory into other fields such as political science. In his book Essence of Decision, political scientist Graham T. Allison specifically attacked the rational expectations theory.

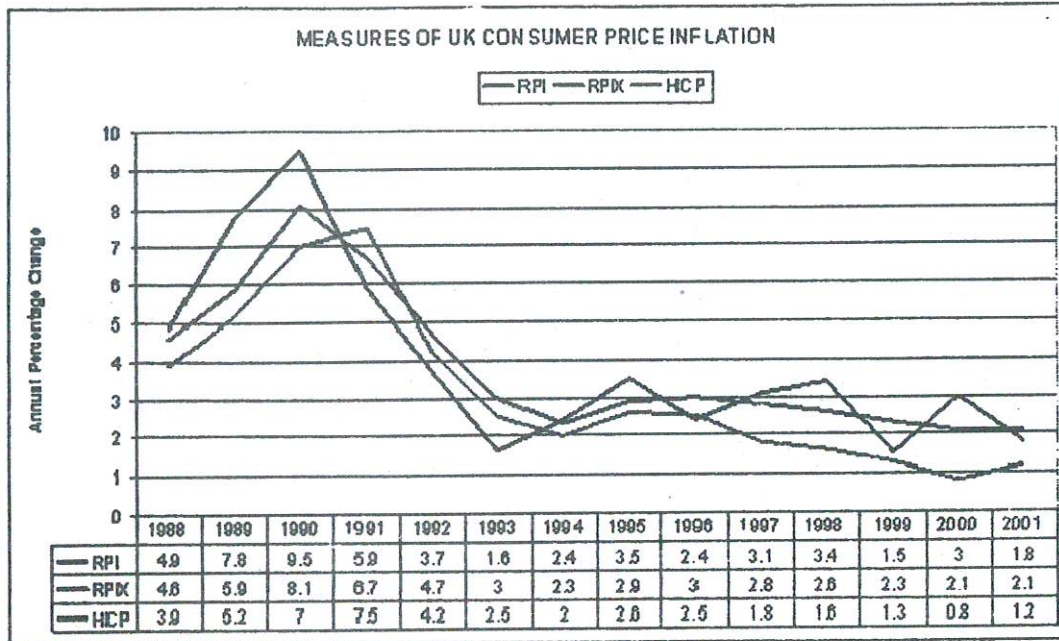
Some economists now use the adaptive expectations model, but then complement it with ideas based on the rational expectations theory. For example, an anti-inflation campaign by the central bank is more effective if it is seen as "credible," *i.e.*, if it convinces people that it will "stick to its guns." The bank can convince people to lower their inflationary expectations, which imply less of a feedback into the actual inflation rate. (An advocate of Rational Expectations would say, rather, that the pronouncements of central banks are facts that must be incorporated into one's forecast because central banks can act independently). Those studying financial markets similarly apply the efficient-markets hypothesis but keep the existence of exceptions in mind.

A specific field of economics, called behavioral economics, has emerged from those considerations, of which Daniel Kahneman (Nobel Prize 2002) is one of the pioneers and main theorist.

2.11 ECONOMICS POLICIES TO CONTROL INFLATION

The control of inflation has become one of the dominant objectives of government economic policy in many countries. Effective policies to control inflation need to focus on the underlying causes of inflation in the economy. For example if the main cause is excess demand for goods and services, then government policy should look to reduce the

level of aggregate demand. If cost-push inflation is the root cause, production costs need to be controlled for the problem to be reduced.



2.11.1 Monetary Policy

Since May 1997, the Bank of England has had operational independence in the setting of official interest rates in the United Kingdom. They set interest rates with the aim of keeping inflation under control over the next two years. Monetary policy can control the growth of demand through an increase in interest rates and a contraction in the real money supply. For example, in the late 1980s, interest rates went up to 15% because of the excessive growth in the economy and contributed to the recession of the early 1990s. This is shown in the chart above.

Today the primary tool for controlling inflation is monetary policy. Most central banks are tasked with keeping the federal funds lending rate at a low level, normally to a target rate around 2% to 3% per annum, and within a targeted low inflation range, somewhere from about 2% to 6% per annum. A low positive inflation is usually targeted, as deflationary conditions are seen as dangerous for the health of the economy.

There are a number of methods that have been suggested to control inflation. Central banks such as the U.S. Federal Reserve can affect inflation to a significant extent through setting interest rates and through other operations. High interest rates and slow

growth of the money supply are the traditional ways through which central banks fight or prevent inflation, though they have different approaches. For instance, some follow a symmetrical inflation target while others only control inflation when it rises above a target, whether express or implied.

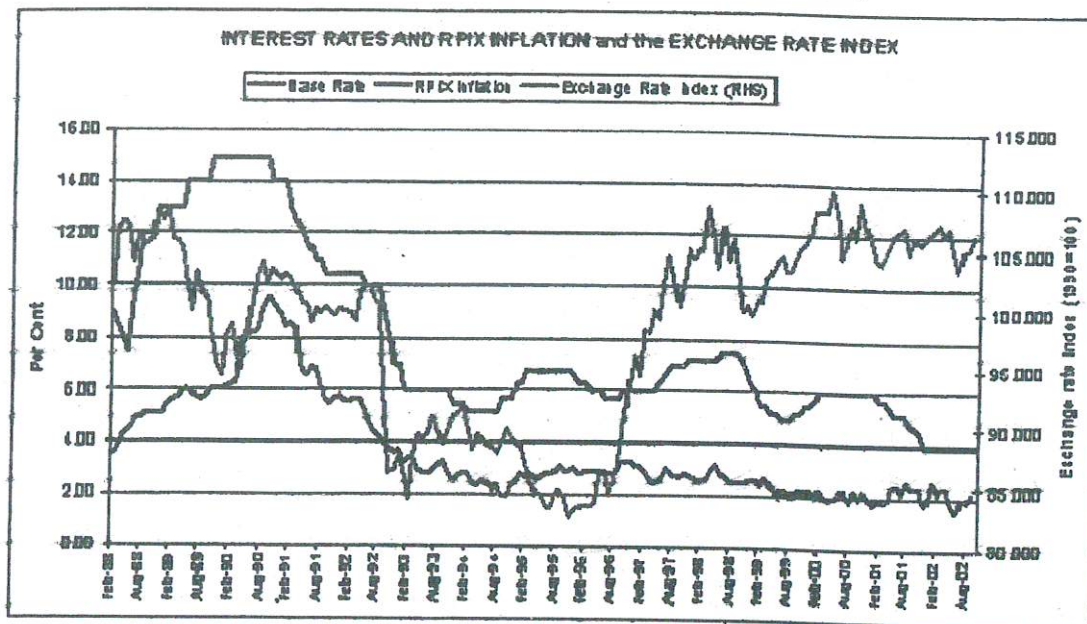
Monetarists emphasize keeping the growth rate of money steady, and using monetary policy to control inflation (increasing interest rates, slowing the rise in the money supply). Keynesians emphasize reducing aggregate demand during economic expansions and increasing demand during recessions to keep inflation stable. Control of aggregate demand can be achieved using both monetary policy and fiscal policy (increased taxation or reduced government spending to reduce demand).

2.11.2 Fixed exchange rates

Under a fixed exchange rate currency regime, a country's currency is tied in value to another single currency or to a basket of other currencies (or sometimes to another measure of value, such as gold). A fixed exchange rate is usually used to stabilize the value of a currency, vis-a-vis the currency it is pegged to. It can also be used as a means to control inflation. However, as the value of the reference currency rises and falls, so does the currency pegged to it. This essentially means that the inflation rate in the fixed exchange rate country is determined by the inflation rate of the country the currency is pegged to. In addition, a fixed exchange rate prevents a government from using domestic monetary policy in order to achieve macroeconomic stability.

Under the Bretton Woods agreement, most countries around the world had currencies that were fixed to the US dollar. This limited inflation in those countries, but also exposed them to the danger of speculative attacks. After the Bretton Woods agreement broke down in the early 1970s, countries gradually turned to floating exchange rates. However, in the later part of the 20th century, some countries reverted to a fixed exchange rate as part of an attempt to control inflation. This policy of using a fixed exchange rate to control inflation was used in many countries in South America in the later part of the 20th century (e.g. Argentina (1991-2002), Bolivia, Brazil, and Chile).

An appreciation of the exchange rate



An appreciation in the pound sterling makes British exports more expensive and should reduce the volume of exports and aggregate demand. It also provides UK firms an incentive to keep costs down to remain competitive in the world market. A stronger pound reduces import prices. And this makes firms' raw materials and components cheaper; therefore helping them control costs.

A rise in the value of the exchange rate might be achieved by an increase in interest rates or through the purchase of sterling via Central Bank intervention in the foreign exchange markets.

The effects of higher interest rates

Higher interest rates reduce aggregate demand in three main ways;

- Discouraging borrowing by both households and companies
- Increasing the rate of saving (the opportunity cost of spending has increased)
- The rise in mortgage interest payments will reduce homeowners' real 'effective' disposable income and their ability to spend. Increased mortgage costs will also reduce market demand in the housing market
- Business investment may also fall, as the cost of borrowing funds will increase. Some planned investment projects will now become unprofitable and, as a result, aggregate demand will fall.

- Higher interest rates could also be used to limit monetary inflation. A rise in real interest rates should reduce the demand for lending and therefore reduce the growth of broad money.

2.11.3 Fiscal Policy

- Higher direct taxes (causing a fall in disposable income) Lower Government spending
- A reduction in the amount the government sector borrows each year (PSNCR)
- These fiscal policies increase the rate of leakages from the circular flow and reduce injections into the circular flow of income and will reduce demand pull inflation at the cost of slower growth and unemployment.

2.11.4 Gold standard

The gold standard is a monetary system in which a region's common media of exchange are paper notes that are normally freely convertible into pre-set, fixed quantities of gold. The standard specifies how the gold backing would be implemented, including the amount of specie per currency unit. The currency itself has no *innate value*, but is accepted by traders because it can be redeemed for the equivalent specie. A U.S. silver certificate, for example, could be redeemed for an actual piece of silver.

The gold standard was partially abandoned via the international adoption of the Bretton Woods System. Under this system all other major currencies were tied at fixed rates to the dollar, which itself was tied to gold at the rate of \$35 per ounce. The Bretton Woods system broke down in 1971, causing most countries to switch to fiat money – money backed only by the laws of the country. Austrian economists strongly favor a return to a 100 percent gold standard.

Under a gold standard, the long term rate of inflation (or deflation) would be determined by the growth rate of the supply of gold relative to total output. Critics argue that this will cause arbitrary fluctuations in the inflation rate, and that monetary policy would essentially be determined by gold mining, which some believe contributed to the Great Depression.

2.11.5 Direct wage controls - incomes policies

Incomes policies (or direct wage controls) set limits on the rate of growth of wages and have the potential to reduce cost inflation. The Government has not used such

a policy since the late 1970s, but it does still try to influence wage growth by restricting pay rises in the public sector and by setting cash limits for the pay of public sector employees.

In the private sector the government may try moral suasion to persuade firms and employees to exercise moderation in wage negotiations. This is rarely sufficient on its own. Wage inflation normally falls when the economy is heading into recession and unemployment starts to rise. This causes greater job insecurity and some workers may trade off lower pay claims for some degree of employment protection.

Wage and price controls have been successful in wartime environments in combination with rationing. However, their use in other contexts is far more mixed. Notable failures of their use include the 1972 imposition of wage and price controls by Richard Nixon. More successful examples include the Prices and Incomes Accord in Australia and the Wassenaar Agreement in the Netherlands.

In general wage and price controls are regarded as a temporary and exceptional measure, only effective when coupled with policies designed to reduce the underlying causes of inflation during the wage and price control regime, for example, winning the war being fought. They often have perverse effects, due to the distorted signals they send to the market. Artificially low prices often cause rationing and shortages and discourage future investment, resulting in yet further shortages. The usual economic analysis is that any product or service that is under-priced is over consumed. For example, if the official price of bread is too low, there will be too little bread at official prices, and too little investment in bread making by the market to satisfy future needs, thereby exacerbating the problem in the long term.

Temporary controls may *complement* a recession as a way to fight inflation: the controls make the recession more efficient as a way to fight inflation (reducing the need to increase unemployment), while the recession prevents the kinds of distortions that controls cause when demand is high. However, in general the advice of economists is not to impose price controls but to liberalize prices by assuming that the economy will adjust and abandon unprofitable economic activity. The lower activity will place fewer demands on whatever commodities were driving inflation, whether labor or resources, and inflation will fall with total economic output. This often produces a severe recession, as

productive capacity is reallocated and is thus often very unpopular with the people whose livelihoods are destroyed (see creative destruction).

2.11.6 Long-term policies to control inflation

Labour market reforms

The weakening of trade union power, the growth of part-time and temporary working along with the expansion of flexible working hours are all moves that have increased flexibility in the labour market. If this does allow firms to control their labour costs it may reduce cost push inflationary pressure.

Certainly in recent years the UK economy has not seen the acceleration in wage inflation normally associated with several years of sustained economic growth and falling inflation. One reason is that rising job insecurity inside a flexible labour market has tilted the balance of power away from employees towards employers.

Supply-side reforms

If a greater output can be produced at a lower cost per unit, then the economy can achieve sustained economic growth without inflation. An increase in aggregate supply is often a key long term objective of Government economic policy. In the diagram below we see the benefits of an outward shift in the long run aggregate supply curve. The equilibrium level of real national income increases and the average price level remains relatively constant.

2.11.7 Cost-of-living allowance

The real purchasing-power of fixed payments is eroded by inflation unless they are inflation-adjusted to keep their real values constant. In many countries, employment contracts, pension benefits, and government entitlements (such as social security) are tied to a cost-of-living index, typically to the consumer price index. A *cost-of-living allowance* (COLA) adjusts salaries based on changes in a cost-of-living index. Salaries are typically adjusted annually. They may also be tied to a cost-of-living index that varies by geographic location if the employee moves.

Annual escalation clauses in employment contracts can specify retroactive or future percentage increases in worker pay which are not tied to any index. These negotiated increases in pay are colloquially referred to as cost-of-living adjustments or

cost-of-living increases because of their similarity to increases tied to externally-determined indexes. Many economists and compensation analysts consider the idea of predetermined future "cost of living increases" to be misleading for two reasons: (1) For most recent periods in the industrialized world, average wages have increased faster than most calculated cost-of-living indexes, reflecting the influence of rising productivity and worker bargaining power rather than simply living costs, and (2) most cost-of-living indexes are not forward-looking, but instead compare current or historical data.

Activity 2

1. Discuss briefly the classical theory of inflation
2. What is the difference between the Keynesian and monetarists view to inflation?
3. Explain Philips curve with suitable examples
4. Write short notes on the following:
 - Natural rate of unemployment
 - Samuelson and Solow's approach to inflation
 - Adaptive expectations
 - Rational expectations

2.12 SUMMARY

The unit explains the concepts and theories of inflation. After introduction it discusses the classical theory of inflation followed by Keynesian view. Monetarist views and Structuralist approaches were discussed in the later sections. The Phillips curve is described as a historical inverse relationship between the rate of unemployment and the rate of inflation in an economy. Various dimensions of Philip curve are explained in detail. Samuelson and Solow's model to inflation has been discussed with relevant concepts and Tobin's modified Philip curve was revealed. Natural rate of unemployment is explained as the unemployment which occurs when the labour market is in equilibrium. It is supply side unemployment, such as frictional and structural unemployment. Finally the concepts related to adaptive and rational expectations are explained in detail.

2.13 FURTHER READINGS

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- George W. Evans and Seppo Honkapohja (2001), Learning and Expectations in Macroeconomics. Princeton University Press



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