



## WEEK 11- THE QUANTITY THEORY OF MONEY AND ITS VARIANTS

### CONTENTS

1.0 Introduction

2.0 Objectives

3.0 Main content

3.1 Meaning of value of money

3.1.1 Measurement of changes in the value of money

3.2 Fisher's quantity theory of money: the cash transactions Approach

3.2.1 Quantity theory of money: Income version

3.2.2 Assumption of the Theory

3.2.3 Criticisms of the theory

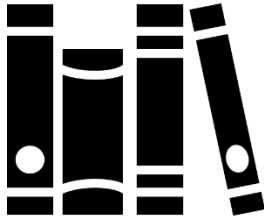
4.0 Conclusion

5.0 References/Further Readings

### 1.0. INTRODUCTION

Value for money is in the perception of the buyer or receiver of goods and/or services. Proof of good value for money is in believing or concluding that the goods/services received was worth the price paid. Examples of the types of factors that may be considered are suitability, quality, skills, price, whole of life costs and other criteria. The mix of these and other factors and the relevant importance of each will vary on a case by case basis. It is also the difference between the amount of work that should have been paid for and the actual amount paid. To calculate the labor rate variance, determine the difference between actual labor rate per hour and standard labor rate per hour and then multiply by number of hours actually worked.

## 2.0. OBJECTIVES



At the end of this unit, you should be able to:

- Define and understand the meaning of macroeconomics as a field of study
- Know the basic macroeconomics concepts

## MAIN CONTENT

### 3.1 Meaning of Value of Money

By value of money is meant the purchasing power of money over goods and services in a country. What a naira can buy in Nigeria represents the value of money of the naira. However, the phrase, value of money is a relative concept which expresses the relationship between a unit of money and the goods and services which can be purchased with it. This shows that the value of money is related to the price level because goods and services are purchased with a money unit at given prices. But the relation between the value of money and price level is an inverse one. If  $V$  presents the value of money and  $P$  the price level, then,  $V = 1/P$ . When the price level rises, the value of money falls, and vice versa. Thus, in order to measure the values of money, we have to find out the general price level.

The value of money is of two types, namely:

1. **The internal value of money and**
2. **The external value of money.**

The internal value of money refers to the purchasing power of money over domestic goods and services. The external value of money refers to the purchasing power of money over foreign goods and service.

### **3.1.1 Measurement of Changes in the Value of Money**

Changes in prices are not uniform. Some prices rise, others fall; while still others remain stationary. They are like bees dashing out of a hive higgledy-piggledy, some buzzing off this way, some that way, while others keep hovering at the spot. But there may be a trend in a particular direction. A comparison of price changes would give a very confusing picture. We have to discover the extent of the overall changes in the value of money before suggesting a remedy. The seriousness of the disease must be known before a remedy can be suggested.

#### **Index Numbers**

The device of index numbers comes to our aid in measuring changes in the value of money or price level. An index number is a statement in the form of a table which represents a change in the general price level. Index numbers have great importance in these days. When it is desired to find out to what extent prices have risen or fallen, an index number is prepared. In every advanced country, index numbers are being regularly prepared officially by the governments and also non-officially by other bodies interested in economic changes.

#### **Preparation of Index Numbers**

The following steps are necessary for the preparation of index numbers.

##### **(a) Selection of the Base Year**

The first thing necessary is to select a base year. It is the year with which we wish to compare the present prices, to see how much the prices have risen or fallen. The base year must be a normal year. It should not be a year of famine, or war, or a year of exceptional prosperity.



### **(b) Selection of Commodities**

The next step is to select the commodities to be included in the index number. The commodities will depend on the purpose for which the index number is prepared. Suppose we want to know how a particular class of people has been affected by a change in the general price level. In that case, we should include only those commodities which enter into the consumption of that class.

### **(c) Collection of Prices**

After commodities have been selected, their prices have to be ascertained. Retail prices are the best for the purpose, because it is at the retail prices that a commodity is actually consumed. But retail prices differ almost from shop to shop, and there is no proper record of them. Hence we have to take the wholesale prices of which there is a proper record.

### **(d) Finding Percentage Change**

The next step is to represent the present prices as the percentages of the base year prices. The base year price is equated to 100, and then the current year's price is represented accordingly.

### **(e) Averaging**

Finally, we take the average of both the base year and the current year figures in order to find out the overall change. In May 1985, the price index was 355 which means that the price on the average were more than three-and a-half times as much or 255 per cent higher than what they were in 1970-71.

### **Uses of Index Numbers:**

Index numbers can be used for a number of purposes.

(i) Index numbers are used not merely to measure changes in the price level or changes in the value of money. They can be used to measure quantitative change. Thus, we can prepare an index number of wages, imports, exports, industrial production, unemployment, profits, area under cultivation, enrolment in a college, etc.

(ii) Such quantitative changes as are measured by index numbers can indicate social and economic trends and help in framing policies with respect to them. For instance, an index number of cost of living can guide us in the adjustment of wages to changing prices.

iii) We can also compare, with the help of index numbers, economic conditions of a class of people at two different periods.

(iv) Index numbers can be used as basis for, and equitable discharge of, contracts relating to borrowing and lending. We know when prices rise, creditors lose. It may perhaps be considered more just to ensure that the creditor gets back the same purchasing power. Hence, when prices rise, the debtor may be asked to pay a correspondingly higher sum to discharge a debt.

### **Limitations**

It may, however, be pointed out that index numbers are not a faultless guide.

They suffer from several limitations, some of which are given below.

#### **(i) Approximations**

Index numbers are at best only approximations. They cannot be taken as infallible guides. Their data are open to question, and they lead to different interpretations.

#### **(ii) International Comparisons Difficult**

Use of index numbers for international comparisons presents several difficulties. The result is that such comparisons are difficult, if not impossible, on account of the different bases, different sets of commodities or differences in their quality, etc.

#### **(iii) Comparisons between Different Times Difficult**

It is not easy to institute comparisons between different periods of time. Over long periods, some popular commodities are replaced by others. Entirely new commodities come to figure in consumption, or a commodity may be vastly different from what it used to be.



**(iv) Measure Sectional Price Levels Only**

Index numbers measure only changes in the sectional price-levels. An index number, therefore, prepared for a particular purpose, may not be useful for another.

An entirely different set of commodities will have to be selected. Different people use different things and hold different assets. Therefore, different classes of people are affected differently by a given change in the price-level. Hence, the same index numbers cannot throw light on the effects of a price change on all sections of society.

**(v) Weighting Changes Result**

One set of weights may yield quite a different result from another, and weighting is all arbitrary.

**3.2. Fisher’s Quantity Theory of Money: The Cash Transactions Approach**

The quantity theory of money states that the quantity of money is the main determinant of the price level or the value of money. Any change in the quantity of money produces an exactly proportionate change in the price level. In the words of Irving Fisher, –Other things remaining unchanged, as the quantity of money in circulation increases, the price level also increases in direct proportion and the value of money decreases and vice versa.

If the quantity of money is doubled, the price level will also double and the value of money will be one half. On the other hand, if the quantity of money is reduced by one half, the price level will also be reduced by one half and the value of money will be twice.

Fisher has explained his theory in terms of his equation of exchange:

$$PT = MV + M^* V^* \dots\dots\dots (1)$$

Where P = price level, or 1/P. = the value of money;

M = the total quantity of legal tender money;



$V$  = the velocity of circulation of  $M$ ;

$M^*$  = the total quantity of credit money;

$V^*$  = the velocity of circulation of  $M^*$ ;

$T$  = the total amount of goods and services exchanged for money or transactions performed by money.

This equation equates the demand for money ( $PT$ ) to supply of money ( $MV + M^* V^*$ ). The total volume of transactions multiplied by the price level ( $PT$ ) represents the demand for money.

According to Fisher,  $PT$  is  $SPQ$ . In other words, price level ( $P$ ) multiplied by quantity bought ( $Q$ ) by the community ( $S$ ) gives the total demand for money. This equals the total supply of money in the community consisting of the quantity of actual money  $M$  and its velocity of circulation  $V$  plus the total quantity of credit money  $M^*$  and its velocity of circulation  $V^*$ . Thus, the total value of purchases ( $PT$ ) in a year is measured by

$MV + M^* V^*$ . Hence, the equation of exchange is  $PT = MV + M^* V^*$ . In order to find out the effect of the quantity of money on the price level or the value of money, we write the equation as

$$P = \frac{MV + M^* V^*}{T} \dots\dots\dots (2)$$

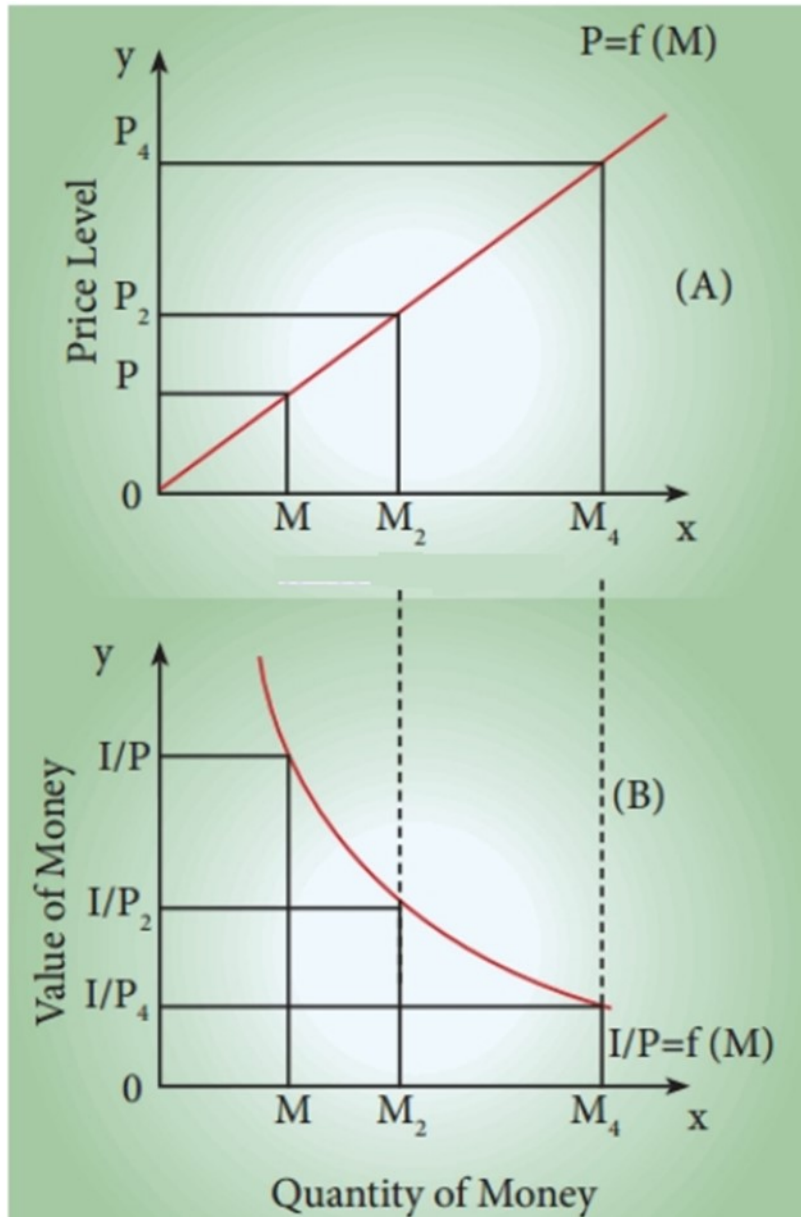
$T$

Fisher points out the price level ( $P$ ) ( $M + M^*$ ) provided the volume of transactions remain unchanged. The truth of this proposition is evident from the fact that if  $M$  and  $M^*$  are doubled, while  $V$ ,  $V^*$  and  $T$  remain constant,  $P$  is also doubled, but the value of money ( $1/P$ ) is reduced to half.

Fisher's quantity theory of money is explained with the help of Figure 4. (A) and (B). Panel A of the figure shows the effect of changes in the quantity of money on the price level. To begin with, when the quantity of money is  $M$ , the price level is  $P$ .



Figure A and B: Fisher's quantity theory of money



1. Figure (A) shows the effect of changes in the quantity of money on the price level. When the quantity of money is OM, the price level is OP. When the quantity of money is doubled to OM<sub>2</sub>, the price level is also doubled to OP<sub>2</sub>. Further, when the quantity of money is increased four – fold to OM<sub>4</sub>, the price level also increases by four times to OP<sub>4</sub>. This relationship is expressed by the curve  $OP = f(M)$  from the origin at 45°.

2. Figure (B), shows the inverse relation between the quantity of money and the value of money, where the value of money is taken on the vertical axis. When the quantity of money is OM<sub>1</sub>, the value of money is  $O_1 / P_1$ . But with the doubling of the quantity of money to OM<sub>2</sub>, the value of money becomes one – half of what it was before,  $(O_1 / P_2)$ . But, with the quantity of money increasing by four – fold to OM<sub>4</sub>, the value of money is reduced by  $O_1 / P_4$ . This inverse relationship between the quantity of money and the value of money is shown by downward sloping curve  $1 / OP = f(M)$ .

### **Numerical example**

Suppose the quantity of money (M) is Kshs. 5,000,000 in an economy, the velocity of circulation of money (V) is 5; and the total output to be transacted (T) is 2,500,000 units, the average price level (P) will be:

$$P = MV/T$$

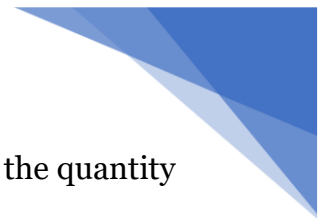
$$= 5,000,000 \times 5 / 2,500,000 = 2,500,000 / 2,500,000$$

$$= \text{Kshs.10 per unit.}$$

If now, other things remaining the same, the quantity of money is doubled, i.e., increased to Kshs.10,000,000 then:

$$P = 10,000,000 \times 5 / 2,500,000 = \text{Kshs.20 per unit}$$

We thus see that according to the quantity theory of money, price level varies in direct proportion to the quantity of money. A doubling of the quantity of money (M) will lead to the doubling of the price level. Further, since changes in the quantity of money are



assumed to be independent or autonomous of the price level, the changes in the quantity of money become the cause of the changes in the price level.

**3.2.1. Quantity Theory of Money: Income Version:**

Fisher’s transactions approach to quantity theory of money described in equation (1) and (2) Above considers such variables as total volume of transaction (T) and average price level of these transactions are conceptually vague and difficult to measure.

Therefore, in later years quantity theory was formulated in income form which considers real income or national output (i.e., transactions of final goods only) rather than all transactions. As the data regarding national income or output is readily available, the income version of the quantity theory is being increasingly used. Moreover, the average price level of output is a more meaningful and useful concept.

Indeed, in actual practice, the general price level in a country is measured taking into account only the prices of final goods and services which constitute national product. *It may be noted that even in this income version of the quantity theory of money, the function of money is considered to be a means of exchange as in the transactions approach of Fisher. In this approach, the concept of income velocity of money has been used instead of transactions velocity of circulation. By income velocity we mean the average number of times per period a unit of money is used in making payments involving final goods and services, that is, national product or national income. In fact, income velocity of money is measured by  $Y/M$  where Y stands for real national income and M for the quantity of money.*

**In view of the above, the income version of quantity theory of money is written as under:**

$$MV = PY \dots\dots\dots (3)$$



$$P = MV/PY \dots\dots\dots (4)$$

Where, M = Quantity of money

V = Income velocity of money

P = Average price level of final goods and services Y = Real national income (or aggregate output)

**3.2.2. Assumptions of the Theory:**

Fisher 's theory is based on the following assumptions:

1. P is passive factor in the equation of exchange which is affected by the other factors. It is determined by other elements or variables and it does not determine them.
2. The proportion of M\* to M remains constant. The inclusion of M\* does not normally disturb the quantitative relation between money and price.
3. V and V\* are assumed to be constant and are independent of changes in M and M\*.Fisher believes that a change in M is unlikely to affect the velocity of circulation of money, since it is determined by subjective factors like people's savings and spending habits and the objective factors like the state of banking and financial institutions, methods of payment, growth and composition of population, central bank credit policy and government policy in respect of taxes and public spending. A mere increase in M, in the opinion of Fisher, will therefore leave V unchanged. Similarly, V\* remains constant and is independent of M\*.
4. T also remains constant and is independent of other factors such as M, M\*, V and V\*. The volume of transactions T, is also assumed as constant and independent of M in the short period. The magnitude of T depends upon M but the state of technology, quantity and quality of productive factors, the proportions in which the factor inputs are employed, degree of labour specialization, extent of integration or disintegration of the business units and the level of employment. Fisher implicitly assumes that there is full

employment of resources in the economy. Since the level of output cannot be stepped up further at full employment, the volume of transactions is unlikely to change.

5. It is assumed that the demand for money is proportional to the value of transactions.
6. The supply of money is assumed as an exogenously determined constant.
7. The theory is applicable in the long-run. The theory assumes the money-price relationship is a long-run phenomenon.
8. Fisher's theory assumes a highly monetized economic system where all transactions take place through the medium of money and barter transactions are completely absent.
9. Money acts only as a medium of exchange and no part of it is hoarded by the people.
10. It is based on the assumption of the existence of full employment in the economy.

Given the assumptions, Fisher established direct and proportional relation between the quantity of money and the price level. To quote him "one of the normal effects of an increase in the quantity of money is an exactly proportional increase in the general level of prices. we find nothing to interfere with the truth of the quantity theory that variations in money(M) produce normally proportional change in prices" Taussig has given expression to Fisher's money price relation in this way: Double the quantity of money and other things being equal, prices will be twice as high as before and the value one money one half. Halve the quantity of money and other things being equal, prices will be one half of what they were before and the value of money doubles.

### **3.2.3. Criticisms of the Theory:**

The Fisher's quantity theory has been subjected to severe criticisms by economists.

#### **1. Truism:**

According to Keynes, –The quantity theory of money is a truism. Fisher's equation of exchange is a simple truism because it states that the total quantity of money ( $MV+M^*V^*$ ) paid for goods and services must equal their value (PT). But it cannot be accepted today that a certain percentage change in the quantity of money leads to the same percentage change in the price level.



## **2. Other things not equal:**

The direct and proportionate relation between quantity of money and price level in Fisher's equation is based on the assumption that –other things remain unchanged. But in real life,  $V$ ,  $V^*$  and  $T$  are not constant. Moreover, they are not independent of  $M$ ,  $M^*$  and  $P$ . Rather, all elements in Fisher's equation are interrelated and interdependent. For instance, a change in  $M$  may cause a change in  $V$ .

Consequently, the price level may change more in proportion to a change in the quantity of money. Similarly, a change in  $P$  may cause a change in  $M$ . Rise in the price level may necessitate the issue of more money. Moreover, the volume of transactions  $T$  is also affected by changes in  $P$ . When prices rise or fall, the volume of business transactions also rises or falls. Further, the assumptions that the proportion  $M^*$  to  $M$  is constant, has not been borne out by facts. Not only this,  $M$  and  $M^*$  are not independent of  $T$ . An increase in the volume of business transactions requires an increase in the supply of money ( $M$  and  $M^*$ ).

## **3. Constants Relate to Different Time:**

The importance of Fisher's exchange equation is limited by the technical inconsistency implicit in it.  $M$  refers to the stock of money at a point in time whereas  $V$  refers to the velocity of circulation over a period. Prof. George Halm criticizes Fisher for multiplying  $M$  and  $V$  because  $M$  relates to a point of time and  $V$  to a period. The former is a static concept and the latter a dynamic. It is, therefore, technically inconsistent to multiply two non-comparable factors.

## **4. Fails to Measure Value of Money:**

Fisher's equation does not measure the purchasing power of money but only cash transactions, that is, the volume of business transactions of all kinds or what Fisher calls the volume of trade in the community during a year. But the purchasing power of money (or value of money) relates to transactions for the purchase of goods and services for consumption. Thus, the quantity theory fails to measure the value of money.

### **5. Weak Theory:**

According to Crowther, the quantity theory is weak in many respects. First, it cannot explain 'why' there are fluctuations in the price level in the short run. Second, it gives undue importance to the price level as if changes in prices were the most critical and important phenomenon of the economic system. Third, it places a misleading emphasis on the quantity of money as the principal cause of changes in the price level during the trade cycle.

Prices may not rise despite increase in the quantity of money during depression; and they may not decline with reduction in the quantity of money during boom. Further, low prices during depression are not caused by shortage of quantity of money, and high prices during prosperity are not caused by abundance of quantity of money. Thus, – the quantity theory is at best an imperfect guide to the causes of the trade cycle in the short period according to Crowther.

### **6. Neglects Interest Rate:**

One of the main weaknesses of Fisher 's quantity theory of money is that it neglects the role of the rate of interest as one of the causative factors between money and prices. Fisher 's equation of exchange is related to an equilibrium situation in which rate of interest is independent of the quantity of money.

### **7. Unrealistic Assumptions:**

Keynes in his General Theory severely criticized the Fisherian quantity theory of money for its unrealistic assumptions. First, the quantity theory of money is unrealistic because it analyses the relation between M and P in the long-run. Hence, it neglects the short-run factors which influence this relationship. Second, Fisher's equation holds well under the assumption of full employment. But Keynes regards full employment as a special situation. The general situation is one of the under-employment equilibrium. Third, Keynes does not believe that the relationship between the quantity of money and the price level is direct and proportional.

Rather, it is an indirect one via the rate of interest and the level of output. According to Keynes, –So long as there is unemployment, output and employment will change in the same proportion as the quantity of money, and when there is full employment, prices will change in the same proportion as the quantity of money.¶ Thus Keynes integrated the theory of output with value theory and monetary theory and criticized Fisher for dividing economics –into two compartments with no doors and windows between the theory of value and theory of money and prices.

### **8. V not Constant:**

Further, Keynes pointed out that when there is underemployment equilibrium, the velocity of circulation of money  $V$  is highly unstable and would change with changes in the stock of money or money income. Thus, it was unrealistic for Fisher to assume  $V$  to be constant and independent of  $M$ .

### **9. Neglects Store of Value Function:**

Another weakness of the quantity theory of money is that it concentrates on the supply of money and assumes the demand for money to be constant. In other words, it neglects the store-of-value function of money and considers only the medium-of-exchange function of money. Thus, the theory is one-sided.

### **10. Neglects Real Balance Effect:**

Don Patinkin has criticized Fisher for failure to make use of the real balance effect, that is, the real value of cash balances. A fall in the price level raises the real value of cash balances which leads to increased spending and hence to rise in income, output, and employment in the economy. According to Patinkin, Fisher gives undue importance to the quantity of money and neglects the role of real money balances.

## 11. Static:

Fisher's theory is static in nature because of its unrealistic assumptions as long-run, full employment, etc. It is, therefore, not applicable to a modern dynamic economy.

$P=MV/T$  reflects the final position of the equilibrium and accepts no variations in the magnitude of  $P$  as long as there is no change in  $M$ . It fails to explain the causal process by which this equilibrium price level is determined and adjustment that the system has gone through to arrive at this specific position of equilibrium. Fisher's theory fails altogether in analyzing the problem in a dynamic way. Keynes in this context remarked, "The real task of such a theory is to treat the problem dynamically analyzing the different elements involved in such a manner as to exhibit the causal process by which the price level is determined and the method of transition from one point to another."

In conclusion, JL Hanson believes that "there has been a tendency to over-criticize the theory and to try and read into it more than Irvin Fisher really intended." He goes on to add that "the crux of the matter is that the quantity equation illustrates a static position of equilibrium which is assumed to prevail at a given moment either before or after a change has taken place and shows the relationship which exists between  $M, V, P$  and  $T$ ."

In a situation where the economy has achieved the state of full employment and the level of output has become fixed, the conclusion given by Fisher's theory is an inevitable outcome and it will hold true in season and out of season. The empirical studies by the writers like Kemmerer and Cassel have supported the Fisherine generalizations about the money-price relationship.

## 4.0 CONCLUSION

The quantity theory of money is the idea that the supply of money in an economy determines the level of prices and changes in the money supply result in proportional changes in prices. In other words, the quantity theory of money states that a given percentage changes in the money supply results in an equivalent level of inflation or deflation. This concept is usually introduced via an equation relating money and prices to other economic variables.



## 5.0 SELF-ASSESSMENT EXERCISE

1. Briefly explain the meaning of value of money
2. Discuss measurement of value of money
3. With the aid of a diagram analyze Fisher's quantity theory of money
4. Evaluate the income version of the quantity theory of money
5. Explain 5 limitations of Fisher's quantity theory of money

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