THE MONETARY FACTORS IN THE INFLATIONARY PROCESS IN NIGERIA: 1969-1989

BY

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DECLARATION

I hereby declare that this thesis is a product of my own research. It has not been accepted any where for the purpose of awarding a higher degree. All references have been acknowledged by way of bibliography at the end of the thesis.



DAVID ADEBISI SAMUEL

CERTIFICATION

This thesis, entitled "The Monetary Factors in the Inflationary Process in Nigeria: 1969-1989" by David Adebisi Samuel, meets the regulations governing the award of the degree of Master of Science of Ahmadu Bello University, Zaria, and is approved for its contribution to knowledge and literary presentation.

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DEDICATION

This thesis is dedicated to my parents, Mr and Mrs Samuel Job and my wife (to be), Sister Joyce T. Abohwo.

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All views and stance in this work are entirely mine, likewise all errors, either by omission or commission entirely my responsibility.

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ABSTRACT

The relative importance of the monetary policy vis-a-vis the fiscal policy in controlling the economic variables has generated a lot of debate and contention in the economic discipline. Of recent again, is the debate between the monetarists and structuralists of the best way to tame the price level movements in an economy. The monetarists have come out to say that the best way to put the price level under control is to manipulate the monetary variables and inflation will cease, or at worse, reduce. On the other hand, the structuralists do not completely agree with the stance, and that inflation is majorly caused by the structural bottlenecks, which even go a step further to hampering the success of the monetary variables' manipulation. The two of them seem to be talking some sense, but which is more appropriate for the Nigerian setting is the main issue.

A number of work on the monetarist approach to inflation have been carried out and with emphasis on the money supply as it affects inflation, and it has been found that controlling the money supply and the attached monetary variables will, to a large extent, moderate inflation rate in Nigeria.

The thesis employed a reduced form of a model to provide the empirical insight into the relationship between money supply, Gross Domestic Product, the budget deficit,

exchange rate, foreign price and inflation, using Nigerian data for the period 1969-1989.

The thesis has shown that money supply significantly affects the movements of the price level. It shows also that the budget deficit, output level, and exchange rate affect the price level. Noteworthy is the impact of money supply on inflation in the 1970s, when the revenue from oil was highly monetised.

Testing the impact of all the variables on the price level, they tend to be swallowed up by the money supply variable. But when their impacts are tested singly, they seem to perform better. The impact of exchange rate on the inflationary process has not been very significant when combined with all the variables and under the period in view. This is because the exchange rate became significant in the last half of the 1980s.

When the explanatory variables are regressed upon by the price level, they tend to perform better than when inflation, as defined, is regressed on their changes. The implication of this is that the monetary variables are significant in price determination but do not contribute to inflationary process as much. Therefore, some other factors might have been responsible for the changes in the price levels which might not be wholly monetary.

Hence, the work was concluded on the note that the monetary factors do not significantly affect inflation, and that government efforts should be geared towards determining the main causal factors for correct policy formulation.

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CHAPTER ONE

THE MONETARY FACTORS IN THE INFLATIONARY PROCESS IN NIGERIA: 1969-1989

1.0 INTRODUCTION

It is abundantly evident since independence that Nigeria had traversed a terrain of fluctuating economic fortunes. More precisely, since the 1970s, one of the chronic problems that have bedevilled the economy is the issue of untaimed price level movements. It had, therefore, become one of the thorniest issues in Nigeria's policy arena today of how best to contain the inflationary pressures. In the first decade after independence, the Nigerian economy witnessed a fairly stable price movement of about annual average of 4.3 per cent. A two digid inflation rate came into being in the 1970s.

The skyrocketing price level in the 1970s was attributed to the emergence of the oil boom that shot up the foreign exchange earnings from the sale of crude oil. This earnings were being monetised rapidly at the expense of the output level which is rather inelastic in supply to meet up with the fuelled aggregate demand that resulted from the monetisation of the crude oil receipts.

This process continued up to 1980/81 when the world oil prices collapsed and this plunged the Nigerian economy into another fiscal crisis. This resulted into a persistent and enlarged budget deficit, internal and external

disequilibria and another dimension of inflationary trend. Several policy measures were adopted to curb the inflationary pressures which, instead of healing the aching problem had rather aggravated it. It was the intensification of both internal and external disequilibria that culminated into the implementation of the structural adjustment programme (SAP) in July 1986. One of the policy strategies was the adoption of the second-tier foreign exchange market (SFEM) since September 1986 to determine a realistic exchange rate for the naira. It had become evident since then that the naira had depreciated sharply against the other major currencies. Specifically, the naira that traded with the US dollar at ₦0.545 = $1.00 in 1980 became ₦3.32 = $1.00 at the end of 1986 and had fallen to ₦7.65 = $1.00 at the end of 1989. Concurrently, the rate of inflation increased from a puny level of 5.4 per cent in 1986 to 40 per cent in 1989. The argument is that the depreciation of the naira has aggravated inflation since the prices of imported inputs required for production have increased sharply. Moreover, the government still operate huge budget deficits that are partly financed from bank credit. This directly affects the monetary base, which influences the total money supply and, consequently, affects the general price level.

It is in the light of these monetary factors affecting the inflation rate that this research work is aimed at investigating into. Emphasis will be placed on the

relationship between money supply and inflation because all the other factors work their way through into price level through increase in the monetary base and, hence, money supply.

1.1 DEFINITION

Inflation is a phenomenon which has gained a worldwide attention in economic policies. It can be defined as a persistent rise in the general price level, as measured ordinarily by some index numbers of prices. The implication of this statement is that not all price increases can be termed inflationary, and that brings us to one of the conceptual problems of inflation. We need to identify the characteristics of a price rise which enable it qualify as inflation. We also need to identify situations which are inflationary, even when they are not fully reflected in price increases, and also determine when an inflationary situation in a country becomes a matter for serious concern. A once-for-all rise in the price level does not constitute inflation. For instance, if indirect taxes and interest rates increase, which are perhaps aimed at curtailing effective demand, which is anti-inflationary measure which may lead to once-for-all increases in consumer prices and higher costs of production would be excluded. Another set of circumstances under which price rises would be excluded from the definition are those when the economy is recovering

from repressive conditions, a situation better considered as reflationary, or when there is general slack or substantial excess capacity.[1] For price increases to qualify as inflationary, they must be persistent or sustained or the rate of increase must be high, as much as 10%. Again, what constitute 'high' is a relative term. The answer to the problems of high would depend upon the characteristic experience of the particular country concerned. What is regarded as high in one country may not be so interpreted in another. A general price rise of about 2% to 3% per annum is referred to as creeping inflation (Beckman, 1973). While inflation rate of about 7% to 8% is referred to as galloping inflation. When the rise increases to the point where prices rise very rapidly at about 50% per month or 600% per annum (Bronfenbronner, 1972) and the value of money declines precipitously with the fear of complete collapse of the currency, then we have hyperinflation[2] (sometimes called run-away inflation). An annual increase of, say, 10% in the consumer price index, even for a number of successive years may amount to a situation of relative price stability in some countries, particularly in Latin America, with a long inflationary experience. On the other hand, an annual increase of about 5% to 6% may be termed inflationary in countries like the Europeans, with relatively long periods of price stability. Hence, the rate of inflation which is likely to evoke national concern would vary among countries and even within the same country, over time.[3]

Another problem faced in defining inflation arises when certain strong economic forces within the economy at a point in time are restrained by artificial controls administered by the central authorities, operated in such a manner as to conceal a rise in prices. Given a standard frame of reference, and if it is agreed that prices are not rising because the economy is not being allowed to function normally, we have a state of affairs described as being one of 'repressed' inflation as opposed to 'open' inflation. A necessary condition for open inflation is that market forces are allowed to function freely without much interference by the authority.[4]

1.3 MEASUREMENT OF INFLATION

There are three indexes, out of a number of other measure of price change in determining inflation in an economy. They are:

(i) the implicit price index (IPI) or the GDP deflator;

(ii) the wholesale price index (WPI); and

(iii) consumer price index (CPI).[5]

The IPI measured the price inflation by measuring price behaviour of goods and services in the country, i.e. the price behaviour of the GDP. Hence, inflation is indicated in terms of this measure when national money income is

rising faster than the national real income. Mathematically,

$$IPI = \frac{\text{GDP at current prices}}{\text{GDP at constant prices}} \times 100$$

The shortcomings of this measure are the selection of appropriate base year and that the data on them are available for most countries like Nigeria, annually and quarterly for the developed ones, this limits the usefulness in practical purposes.

The WPI measures prices of raw materials, intermediate materials, producer finished goods and consumer finished goods, which are not sold directly to consumers. This measure is an indicator of future trends in consumer goods prices. It is limited in use because of its coverage. Since it covers prices of commodities at various stages of production and distribution, it can generate duplication which can affect the entire index. It does not reflect changes in quality. Changes in quality may be in form of an improvement or deterioriation. Quality improvements, for example, could outweigh price increases, in which case, it would be conceptually inappropriate to speak of rising prices. The only problem, of course, is in qualifying the quality changes. It is not affected by geographic dimension, since prices for its construction are obtained through given industries or sectors.

The third indicator of price changes is the CPI which, from the standpoint of consumers' welfare, is the most useful; since it affects the real income as a result of the price changes. It is again limited by coverage. Since production is to satisfy consumer demand ultimately, it only centres on the household expenditures. It also does not reflect quality changes that might have taken place over time. It is also deficient because of the long delay in many countries in updating the sample of goods and services comprising the 'market basket'.

In Nigeria, WPI is not published by the Federal Office of Statistics nor the Central Bank (since these sources are the most reliable ones), that leaves us in this research work to use the published CPI by the Central Bank as a proxy for measuring the price level.

Money stock is the amount of money available at any point in time in an economy, while the money supply is a flow concept that has a time dimension attached to it; hence, it is the amount of money in circulation over a period of time at certain rates of interest. The money stock definition used in Nigeria is M_1 and that is what will be used in this analysis (see Section 2.2.1 for various definitons of money supply).

1.4 PROBLEM STATEMENT

According to the monetarists, there exists a direct relationship between money supply in an economy and the price level (Hume, 1752). One of the pioneers of this school of thought is Irving Fisher, who modelled the equation of exchange as:

$$MV = PQ \quad .... \quad (1)$$

where P = average price of goods and services

Q = volume of goods sold

M = stock of money

V = number of times each unit of money has been used on average in the year

The concept is further widened to take account of the varied transactions in a more complex economy with inter-firm sales, purchases of intermediate products, second-hand goods sales, purchases of property and financial assets. The volume of such transactions was indicated by T, and average price by P, so that (1) becomes:[6]

$$MV = PT \quad .... \quad (2)$$

where: V = velocity of circulation of money with respect to all transactions

At the conceptual level, the model appears perfect and straightforward, but it is dangerous to just take the identity and uncritically use it to explain economic events, to predict future events, and to form the basis of policy formulation.

Economists and even politicians have been tempted to succumb to the proposition that when money stock is increased by a certain proportion, that price will rise by the same proportion on the supposition that V is constant (depending on the monetary habits) and Q is constant (assuming full-employment and, hence, no possible expansion in output). Hence, from the identity MV = PQ, they have made the transition to the equation or economic function (Hume, Wicksell, Fisher, 1955, 1898, 1930)

$$P = \alpha M \quad \ldots\ldots \quad (3)$$

where α = a constant equivalent to V/Q.

Thus, the identity is transformed into a theory explaining the variatons in the price levels by the variations in the stock of money. With this mathematical transformation, this research work is out to address the following questions which form the central issues that lead to the study, especially in the Nigerian economy.

(i) How true is it to assume that V and Q are fixed, especially in a dynamic economy of nowadays? (Ford, 1971)

(ii) If V and Q are assumed to be fairly stable over time, is the relationship between price and money stock direct?

(iii) If it is direct, is it proportionate?

Quite a number of writers have affirmed that there is a positively high degree of relationship between money supply and inflation,[7] while a few others have opted for the fact that it will be direct but not high.[8] (See the literature review on money supply and inflation in Chapter Two for the various reasons behind these stance).

1.5 OBJECTIVES

In view of the contrasting opinions about the factors that best can account for the movements of the price levels in Nigeria, we attempt to see how the complete model of the monetary factors work their ways as they interract to affecting the price level in Nigeria. The objectives can be summarised thus:

(i) Investigate the relationship between the money supply and inflation.

(ii) To test for the proportionality of the two variables.

(iii) To analyse what happens to the price level when the assumptions of constant V and Q do not hold.

(iv) Investigate the relationship between the exchange rate and inflation.

(v) Investigate the relationship between the budget deficit and inflation.

(vi) To establish the relationship that exists between the lagged money supply, price level lagged and the price level this year.

(vii) To draw policy implications of the findings and to identify which of the variable(s) needs to be addressed for policy formulation.

1.6 JUSTIFICATION

The essence of this study is to investigate into the concrete existence and nature of relationship between money supply, exchange rate, output level, fiscal deficit, etc, and price level movements, so that the result can be useful in policy formulation. This general approach to the monetary explanation of inflation is relevant in view of the economic liberalism of the SAP, which shows a heavy reliance on imported inputs, exchange rate depreciation and other cost elements imposed by adjustment measures that "put upward pressure on prices" (Ajakaiye, 1987). It is in this spirit that it was argued that the ever-rising inflation has discredited Keynesian fiscalism and monetary orthodoxy, the application of demand management techniques to control it would have little result, if any (Egwaikhide, 1991). This study would help through the macroperspective of inflation adopted to attain a level of inflation that will be sustainable if the prescriptions to be offered is correctly implemented.

1.8 METHODOLOGY

This work shall use a reduced form of a complete model which shall be built in Chapter Two to regress the price level or the inflation rate on the specified explanatory variables. Various tests of hypothesis shall be conducted to determine the impact of the variables on the price level and their changes on the inflation rate.

1.9 SOURCES OF DATA

The sources of data for this research work are mainly secondary. Use are made of various journals, magazines, reports. The consumer price index and money supply figures are obtained from the Economic and Financial Reviews, Annual Reports and Statement of Accounts of the CBN, the exchange rate, foreign price (with the US CPI as a proxy), budget deficit, are obtained from the International Financial Statistics of the IMF, and many other unpublished projects.

1.10 CHAPTER SCHEME

This work is divided into five chapters. Chapter One gives the introduction to the work, the research problems, the objectives, the methodology and the sources of data. Chapter Two is a presentation of the review of the relevant literatures, the theoretical framework and the model to be used is derived or built from it. Chapter Three gives an

overview of money supply and inflation in Nigeria. Chapter Four presents the analysis of the results obtained with the available data. The work is concluded and summarised in Chapter Five with the relevant policy prescriptions.

FOOTNOTES

1. Palmer, E. and Faseku, S.A., Measurement of Inflation Conceptual and Statistical Problems, p 28, NISER, Ibadan.

2. Bronfenbronner, M. (1972), "Inflation in David, L.S. (1972), International Encyclopedia of the Social Sciences, vol 7.

3. Ibid, 1, p 29.

4. US News and World Report, Inflation Simplified.

5. US Department of Commerce, Bureau of Census, Methodology of Consumer Expenditures, Survey; Working Paper, 27, edited by Robert Pearl (Washington).

6. Ford, A.G., Income, Spending and the Price Level, p 123, Fontanta.

7. Falegan, S.B. and Ogundare, S.O., "Causes of Inflation including the relative importance of Internal and External Causes" in Inflation in Nigeria, pp 131 and 138, NISER, Ibadan.

8. Ajayi, S.I. and Teriba, O., "The Inflationary Process in Nigeria, 1960-1972: Evidence from Quarterly Data" in Inflation in Nigeria, p 116, NISER, Ibadan.

CHAPTER TWO

LITERATURE REVIEW

The problem of inflation has become a worldwide phenomenon. Almost every country aims at achieving a stable price level, and the consequences of the price increases are known to all. It has brought down the purchasing power of income earners and the cost of living is constantly escalating. In view of these, various countries have tried several policy measures in combating the inflation rate, but with little or no success achieved. The problem now is that so many theories are behind the price increases, and each proponent tends to enthrone his own theory as the main cause of inflation. But we have seen in practice that no one theory has absolute claim to price increases. The causes of inflation are quite interconnected and dynamic. The cause of inflation in this period may not be the same next, and the cause in a country may not be the same for others; or even, the nearest country. Attempts are made to briefly review the various theories of inflation. Some of them overlap.

Section 2.1 below presents the various theories of inflation while Section 2.2 presents the theory of money supply. Section 2.3 presents the relationships between the money supply and inflation.

2.1 THEORIES OF INFLATION

2.1.1 Keynesian Theory of Inflation

Keynes approached the inflationary problem from the point of view of income analysis, rather than specifically from the point of view of monetary analysis.

The analytical apparatus of the General Theory at less than full-employment throws into relief the role of the wage unit together with the level of employment as the direct determinants of the price level.

Shifts in the wage level or cost-push

In the simple Keynesian model, the general price level is determined by the scale of output (and hence the employment level) and the money wage unit. This is so because the money wage level was assumed fixed and the market for goods and services taken to be perfectly competitive.[1] Hence, the money wage level, the marginal product of labour was made equal to the real wage:

$$MP = W/P \quad .... \quad (4)$$

where MP = marginal product of labour

W = money or nominal wage

P = price level

W/P = real wage

Multiplying both sides by P, we have:

$$P.MP = W \quad ..... \quad (5)$$

It then follows that, given the money wage rate and the level of employment, there is only one price level which is consistent with the level of employment from the point of view of profitability. But while the market for goods is treated as competitive market, the market for labour is not.

Suppose there is a shift in nominal wage rate, given a nominal money supply, via using a quasi-process analysis. If there is an initiation of an upward movement in wage level by the trade unions, at some level of employment that is less than full, in order to maintain the existing level of employment, prices have to rise to make the old level of employment profitable at the new wage rate. This action of price increase leads to disequilibrium in the money market, becaue an increase in prices increases the level of money income which leads to increase in transactinary demand for money. Since the stock of money is fixed, additional money for transactions purposes can only be obtained if holders of idle balances are willing to release some proportions of their money holdings. A rise in interest rate leads to a fall in investment which leads to a fall in expenditure below the rate of production at the old employment level. If this happens, supply of labour is greater than the demand and it is likely that the level of employment will fall. Therefore, an increase in wage leads to an increase in prices which leads to a fall in employment. An alternative to counter the increase in wage rate is to cut down

employment without increasing the prices to maintain that equilibrium, MP = W/P. However, the actual combination of a fall in employment and a rise in the prices that restores equilibrium will depend in general on the actual nature of the relationships that hold in the individual markets, under the constraints that the reaction of the system to the wage shift is stable.

If the investment schedule is highly interest rate elastic and the liquidity preference curve is highly inelastic, both in the neighbourhood of the initial market equilibrium, then the existence of a constant MP of labour in the relevant range should ensure that the bulk of the adjustment takes place through employment rather than price.[2]

Suppose we relax the assumption of fixed money supply, it is then possible for the government to counter the effect of increased money wage and prices of output. Economists and observers in the early post-war period began to argue that it was pressure of wages that was principally responsible for the rapid rise in prices in the western industrialized countries. Yet, if this was the diagnosis, why then was it not accompanied by unemployment from what was explained above? It was criticised that it was just a facade rather than the reality of inflationary process. Argued also was the fact that the wage-price spiral representing a primary cause of inflation was a fallacy.[3] Relaxing the assumption of fixed money supply, in the simple

Keynesian model, the effect on employment of a shift in nominal wage rate may be zero, the same thing holds if there is an increase in government expenditure. If there is an upward shift in wage rate which leads to increased price and interest rate, the government can circumvent the fall in the resultant output by investing or increasing their autonomous expenditure to bridge the gap of unemployment that should have resulted. In the same vein, money supply can be increased to maintain the old employment at the new wage rate and new price levels. The fact now is that the situation is not that of economic analysis, but of policy, which requires some resolution of the conflicting social goals of employment and price stability.

Algebraically, given the equilibrium of the aggregate price and output levels. It can be shown that an upward shift in wage rate leads to an increase in price level, and that it leads to a fall in output.[4]

$$Pe = Y^{b}K^{-b}[C1-b)^{-1}Wo]^{1-b} \quad .... \quad (6)$$

$$Qe = K^{b}[C1-b)Wo^{-1}Y]^{1-b} \quad .... \quad (7)$$

where Pe = price level at equilibrium

Qe = output level at equilibrium

Wo = wage rate

Y = aggregate demand

b = elasticity

$$\frac{\partial Pe}{\partial Wo} = Y^{b}K\ [C1-b)^{-1}\ Wo]^{-b} > 0 \quad .... \quad (8)$$

Thus, an increase in the going wage rate causes the equilibrium price to rise.

$$\frac{\partial Qe}{\partial Wo} = -K^{b}\,[(1-b)W^{-1}Y]^{-b}$$

$$= -K^{b}\,(1-b)^{2-b}Y^{1-b}W^{b-2} < 0 \qquad \ldots . \qquad (9)$$

Expression (9) shows a fall in output as wage rate *increases.*

The mechanism by which this increase in wage rate transmits into higher prices is thus: When the labour union has the power to exploit the market, as soon as the wage rate is increased, the cost of production also increases, and this leads to increase in the price of output. A rise in the price of the goods brings down the purchasing power and again, increase in wages. This will eventually result in wage-price spiral.

The cost inflation can also be generated by the actions of companies that have strong monopoly powers. They have the monopoly power to arbitrarily fix prices to realise their desired profits, hence, this can be termed profit-push inflation. It is profit that becomes the major determinant of prices. Price rises because firms raise their prices autonomously in order to increase their share of national income. This increase in price may not be accompanied by increase in output.

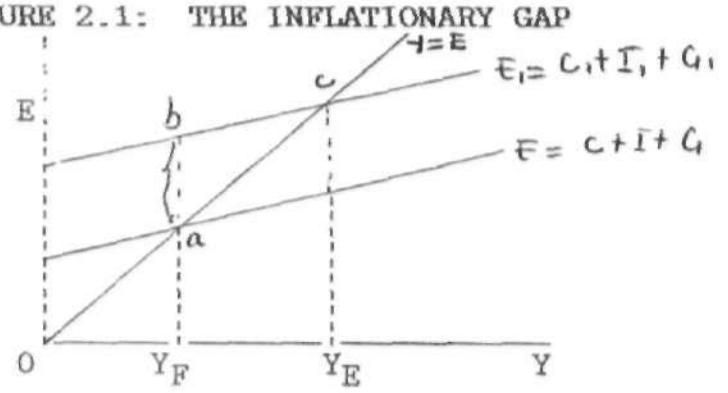
2.1.2 Demand-pull inflation

This theory explains inflation from the aggregate demand side. In his pamphlet, "How to pay for the War", Keynes applied the broad expenditure or effective demand principle to the analysis of potential inflation during the Second World War. One of the effects of the war was to increase the level of national output, but to reduce very sharply, both in proportionate and absolute terms, the amount of production available for consumption and domestic investment, designed to increase consumer goods capacity, all these at the pre-war wage and price levels. Money income has also increased, so that, given a constant average propensity to save, the demand for goods has also increased. This resulted in a chronic imbalance between the demand for and supply of goods at the original wage and price levels.[5] Left alone, this excess of monetary demand over monetary supply was assumed to result in a rise in prices - this would continue until there is a balance between the two forces. As at then, it was proposed that, to prevent that sharp rise in general prices, to raise taxes on income to reduce the level of disposable income until there was a balance. The question now is how to finance the war without an excessive rise of price level and interest rate.

The foregoing analysis utilizes the concept of 'inflationary gap'. It can be defined as the difference between the current level of production valued at current

market prices and the same quantity of production valued at the limit prices that purchasers are prepared to pay. It should not be erroneously inferred that a rise in the price level from the current to the limit level would wipe out the inflationary gap and so restore equilibrium in the goods market. This is further supported by Professor M. Friedman that "the mere revaluation of the goods available for sale does not by itself close the gap.[6] In general terms, they are excess demand analyses that assume that at full-employment[7] at least, prices are fully flexible, and are pulled up by the existing level of excess demand.

FIGURE 2.1: THE INFLATIONARY GAP



where: Y = output level

E = aggregate demand

ab = inflationary gap

C = household consumption

I = firm's gross investment

G = government expenditure

Y_F = full employment income

Y_E = equilibrium income

The demand-pull inflation can be explained by the

diagram above. The economy is said to be at full-employment at Y_F; where the aggregate demand is equal to the aggregate supply at point a. If there is an increase in the aggregate demand or any of the components, such that it shifts upward, it will create an imbalance in the economy. Since the economy could not immediately adjust to the demand level, in order to 'bridge' the gap, prices have to rise. This price rise is called "too much money chasing too few goods".

Given the following equilibrium positions of price levels in the general market.[8]

$$Pe = \frac{mr(a+Io+bt+G) + Ir(M-mo).K^{-2b/(1+b)}}{mr(1-b+bt) + Ir\ mr\quad (Cl\ w/p)} - \frac{(1-b)}{(1+b)} \quad \ldots\ldots (10)$$

$$Pe = Y^{(1+b)/2}\ K^{-b}\ [(1-b)\ lw]^{-(1-b)/2} \quad \ldots\ldots (11)$$

$$Pe = Y^{b}K^{-b}\ [(1-b)^{-1}\ Wo]^{1-b} \quad \ldots\ldots (12)$$

Taking the partial derivative of equation (10), (11) and (12) with respect to Y

where Pe = equilibrium price level

Y = aggregate demand

$$\frac{\partial Pe}{\partial Y} = K^{-2b/(1+b)}\ (cl\ w/p)^{-(1-b)/(1+b)} > 0 \quad \ldots\ldots (13)$$

$$\partial Pe/\partial Y = 1/2(1+b)K^{-b}\ [(1-b)lw\ Y]^{-(1-b)/2} > 0 \quad \ldots\ldots (14)$$

$$\frac{\partial Pe}{\partial Y} = bY^{b-1}K^{-b}[(1-b)^{-1}\ Wo]^{1-b} > 0 \quad \ldots\ldots (15)$$

Since the derivatives of price with respect to the aggregate demand is positive, it indicates that the increase in the aggregate demand stimulates price increases.

2.1.3 Structural Inflation

Both the demand-pull and cost-push inflations were prevalent in the 1940s, but the notion that money wages and prices could be pushed independently of the state of demand due to various structural features of the economy emerged as a competing hypothesis in the 1950s.[9] It is basically supply-oriented inflation rather than demand. That tells us why the structuralists have decided to use a term like "inelasticities of supply"[10] to describe it. Inflation can result from certain structural factors, such as sluggish growth of one or more sectors in an economy, which leads to supply shortages. Factors such as infrastructural bottlenecks, import bottlenecks, inadequate and unstable government revenue create situations that generate inflation.

This theory has been identified with the underdeveloped economies, which are basically aggragarian, and whose agricultural products could not rise to match with the high demand of the populace. Apart from the shortage of production in the sector, it has witnessed serious neglect through rural-urban migration which further aggravates the

food shortage in such an economy. In addition to these bottlenecks in the sectors is the transportation problems, poor infrastructural facilities to serve the peasant farmers who are engaged in production. All these factors join forces together to compound the food shortages vis-a-vis the growing population which leads to constant price increases.

There is also the import bottlenecks associated with the LDCs as a causal factor of inflation. These economies are characterised by dwindling foreign exchange reserves. Because they are exporters of primary products such as agricultural products whose production depends on the vagaries of weather, and whose foreign reserves depend on the prices in the world market of these products. Such countries thus import goods when they have foreign exchange boom. But whenever there is a shortage, they embark on several measures to control imports. Such measures lead to shortages which stimulate price increases. Even when they experience foreign exchange boom, they attempt to monetise such reserves which increases money supply that is not accompanied by a corresponding increase in output which is also inflationary.

2.1.4 The Quantity Theory Explanation

There had been an insight into this theory right from the Mercantilist era, in the 18th century.

At about the middle of the 18th century, economic thought was directed mainly to current problems of economic policy: there was no separate science of economics. There was no coherent view of the economic process and, therefore, some of the ideas were often inconsistent. Moreover, much economic writings came from merchants and politicians, who have various interests to defend. However, common elements could be found in most of these discussions, among these is the need for government intervention in order to achieve a surplus in international trade and, with it, an inflow of the precious metals.[11]

In view of this, Adam Smith (1730-1790) in the book IV of his Wealth of Nations, attacked the doctrine of government intervention in order to achieve an inflow of precious metals. The Mercantilists equated precious metals with the wealth of a country. That if a country's wealth consists of precious metals and they are not produced in that country, then it can be increased only by a surplus in international payments that is paid in gold or silver. Furthermore, many mercantilists were of the opinion that increase in the quantity of money leads to lowering of interest rate (which was later used by Keynes).[12] In addition, some mercantilists believed that money stimulates trade directly. More money would mean more production and less unemployment.

They generally believed that there is a relationship between the value of money, i.e. the purchasing power, and

the quantity of money in circulation. It was later that they saw a relationship between the inflow of gold from South America into Europe and the price rises in Europe in the 16th century, which later attracted attention, as testified by Jean Bodin (1530-1596).[13] As an opposition to the mercantilists ideas on the importance of a large quantity of money came the opinion that an increase in the quantity of money resulted in price rises and so harmed trade.

The emergence of the quantity theory can be viewed as a reaction to the mercantilist tendency to identify wealth with money, and to the experiment of John Law, in whose opinion wealth could be attained by a large quantity of money.[14] According to the founders of the quantity theory, John Locke (1623-1704) in his essay, "Consequences of the Lowering of Interest" and "Raising the Value of Money" of 1691 and David Hume (1711-1776) in his essay on money of 1752, the quantity of money is of no significance for a country's wealth.[15] It was John Locke that greatly refined the quantity theory as it relates to production. He introduced the 'quickness' of circulation, which later became the velocity.

2.1.5 The Crude Quantity Theory

The theory was developed by Irvin Fisher in a measurable manner. The quantity theory can be formulated as

follows: ceteris paribus, a change in the quantity of money causes a proportionate change in the price level. Fisher modelled the quantity theory in the form of the equation of exchange, as

$$PT = MV \quad \ldots\ldots \quad (16)$$

where P = average price levels

T = volume of transactions

M = stock of money

V = velocity of circulation

The theory is real quantity theory if these following conditions are fulfilled:

(1) The quantity of money varies independently of prices and of physical volume of transactions.

(2) The velocity of circulation is an institutional datum that varies slowly at the most, and in any case, is independent of prices and volume of transactions.

(3) Transactions or outputs are unrelated to the quantity of money.

(4) Variatons in the quantity of Money, unless they be absorbed by variations in output in the same direction, act mechanically on all prices, irrespective of how an increase or decrease in the quantity of money is used and on what sector of the economy it first impinges.

the price of these assets are inversely related). If investment is interest rate elastic, a fall in the rate of interest leads to high investment which tends to increase output, for an economy below full-employment level. But given the assumption of full-employment, output can not be expanded beyond that level. What happens is that aggregate demand will shift above the output level, and prices will be forced up. (This is the neo-Keynesian view of transmission mechanism).

In conclusion, Fisher used a more sophisticated approach, by including the quantity of deposit with banks, M^1, and the velocity of deposit money, V^1. The equation of exchange then becomes:

$$PT = MV + M^1 V^1 \quad \ldots\ldots \quad (19)$$

The Cambridge explanation

The Cambridge or cash balance approach to the quantity theory is another variant, which was proposed by the Cambridge School of Economics. Among the proponents were Alfred Marshall, A.C. Pigou, Robertson and Keynes. It is considered analytically superior to the Fisher's equation. They maintained that the value of money must be understood in terms of its supply and demand. They take the money supply as exogenously given by the monetary authorities and the focus now is on the demand for money, which is said to be a constant fraction of the nominal income. One step ahead the Fisherian equation is the ability to measure the

This equation of exchange can not be used to interpret any economic phenomenon unless certain restrictive assumptions are invoked on it. It is assumed that the velocity is constant as condition two above states. Also assumed is the constancy of T, since the economy is assumed to be operating at full-employment equilibrium. If the assumptions above are realistic, then the equation (16) becomes:

$$PTo = MVo \qquad \ldots\ldots \qquad (17)$$

$$P = \frac{Vo}{To} M = \alpha M$$

$$\Longrightarrow P = \alpha M \qquad \ldots\ldots \qquad (18)$$

where $\alpha = Vo/To$

Equation (18) tells us that a proportionate change in the money stock leads to a proportionate change in prices.

The mechanism by which an increase in money supply is transmitted into higher prices is as follows: If the central authority wants to increase the money supply by buying government securities from the public, thereby increasing the cash holdings of the public, that will create an imbalance of their excess cash in their portfolio (given that the cash is a close substitute for these financial assets). In the attempt to balance their portfolio holdings, they go to purchase non-cash financial assets and as they do this, they drive up the prices of these assets and force the interest rate down (since interest rate and

value of T. The equation now focuses on the fact that the amount of money an individual will desire to hold in cash is a proportion of the total nominal income.

$$Md = k\,PY \qquad \ldots\ldots \qquad (20)$$

where Md = demand for money

k = the reciprocal of the Fisherian V

P = price level

Y = income level

Again, if k is held constant together with Y, and money supply is equal to money demand at equilibrium, then

$$Ms = \beta\ P$$

$$\text{or} \quad P = 1/\beta\ Ms \qquad \ldots\ldots \qquad (21)$$

where $\beta = kY$

Thus, the Cambridge equation establishes a relationship between the supply of money and the price level. The central issue in the quantity theory is that any proportionate change in the money supply will produce an equiproportionate change in the price level.

The classical monetary explanation of the price movements is centred on the changes in the stock of money. In his "The Optimum Quantity of Money", Milton Friedman categorically stated that all other factors like demand pull, cost-push, profit-push, structural based, etc, that cause inflation in an economy, all attribute price movements to the (socially) misguided behaviour of particular individuals or groups.

> "My own view is that these alternative explanation play little or no role in either long run or large movements in prices, though may in short and minor movements, except indirectly as they affect the supply of money."[16]

The argument that a proportionate change in the stock of money produces a corresponding change in the price level is also affirmed by Friedman, but he pointed out that the relationship between them, while close, is not, of course, precise or mechanically rigid. The factors that create discrepancies are: (a) changes in output, (b) changes in the amount of money that the public desires to hold relative to its income.[17] The implication of this is that if the assumption of full employment and the constant velocity is relaxed, then we can not 'a priori' tell what direction and by what magnitude the change in price will be in response to the change in money stock. In all, Friedman had come out very clear based on the empirical studies on inflation and money supply in almost all economies of the world. He affirmed that "long-period changes in the quantity of money relative to output determine the secular behaviour of prices. Substantial expansion in the quantity of money over short periods have been a major proximate source for the accompanying inflation in prices."[18] In another writing of his, he had emphatically stated that "inflation is always and everywhere a monetary phenomenon."[19]

All the theories: demand-pull, cost-push, structural and quantity/monetarist theories that have been discussed above,

are all interrelated in an economy. No one of the causes can just end up in a persistent increase in prices if not fuelled by other factors. Inflation can originate in the monetary sector that will have a spiral effect on the aggregate demand, cost of production and even back again to the monetary sector. Perhaps, it is these interwoven causal factors that made it a little difficult to attain a stable price movement via any specified policy measure.

2.2 MONEY SUPPLY

2.2.1 Definition of Operational Terms

Several of the world's leading monetary economists are in open disagreement over how the money supply should be defined. They are engaged in a dispute that is unlikely to be resolved easily, if at all.

(i) Money can be defined as anything that actually functions as a generally accepted medium of exchange for goods, services, assets and payment of assets. Money is the most liquid asset.

(ii) The liquidity of an asset is the ease with which it can be exchanged, for example, a one naira note can be more readily exchanged than an acre of land.

(iii) The stock of money is the amount of money existing at any given time. It has various modern definitions. It

ranges from M_1, M_2, M_3, etc. M_1 refers to currency plus demand deposits.

(iv) Demand deposits are non-interest-bearing checking account balances in the banks. The word 'demand' refers to the fact that they can be withdrawn on demand with no notice required. When we add the savings deposits to M_1, we have M_2 minus the negotiable certificates. When we add to M_2 mutual savings bank deposits, savings and loan shares and credit union shares, we have M_3 and so on.

Recently, some customers want interests to be paid on their demand deposit balances. The experiment was carried out in New England in 1974, where a new checking account that yields interest rate was introduced called "Negotiable Orders of Withdrawals" - NOW.

(v) All these definitions of money are called stock of money in circulation. But that is different from the money supply. Various stocks correspond to the various definitions, e.g. M_1, M_2, M_3, etc. On the other hand, money supply is a schedule of the money stock that would be available at various interest rates, just as supply of a product is a schedule linking the quantity available for purchases with the various price levels. The definition of money supply that will be used in this research work is that used in Nigeria, and that is M_1 - currency plus demand deposits, it gives what is refered to as the narrow definition of money supply.

(vi) Another concept that requires operational definition is the High-Powered money or monetary base, denoted by H. It has two components: the total currency, - C - held in circulation with the public and the bank reserves - R. In general, the high-powered money can be defined to consist of the assets in the banking system which serve as primary reserve.[21]

$$H = C + R \quad \ldots\ldots \quad (22)$$

(vii) Reserve ratio is the reserves (cash or immediate claims to cash) that are equal to a fraction of its deposit liabilities.

(viii) The currency-deposit ratio is the ratio of the total currency in circulation to the total demand deposits in the commercial banks. The currency is always less than the demand deposits, which implies that the ratio is less than unity.

(ix) Reserve-deposit ratio is the ratio of the reserve requirement to the total deposits. It is also less than unity. Changes in the rate of interest to be earned by the banks on loans advanced and related investments determine the reserve-deposit ratio. It is also dependent on the minimum reserve requirement. If the return on the loans is high in relation to the rediscount rate (the rate of interest that commercial banks pay on reserve borrowed from the Central Bank), they may decide to readjust their portfolio balances to increase investment purposes.

(X) The money multiplier shows by how many times a change in the high-powered money will lead to an increase in money supply in an economy[22].

We have defined money supply to mean the total currency plus the demand deposits. Suppose the government increases the high-powered money which increases the cash holding of an individual, and given the following assumptions, he deposits that extra cash in the bank, what amount will be generated as money supply in the economy through the money creation of the commercial banks in the economy? Assuming that:

(i) the public holds all the currency that it desires so that any additional money that is created will all be placed on deposit.

(ii) the banks lend all deposits up to the legal reserve requirement established by the Central Bank and that they do not maintain excess reserves.

(iii) the legal reserve ratio is r%.

(iv) the bank's only assets are in reserves and loans, its only liabilities are in demand deposits.

If the increase in the high-powered money is ₦1.00, and it is deposited in the commercial bank, the bank will now keep r% of that ₦1.00 and loan out the excess reserve. The borrower then deposits it in another bank. The value of the second deposit, α , will be equal to the excess reserves

generated by the first deposit, or

$$\alpha = 1 - (1)r = 1 - r \qquad \ldots\ldots\ldots\ldots\ldots\ldots (23)$$

The value of the third deposit will be the value of the second deposit, α , minus the required reserves on the second deposit, or

$$\alpha - \alpha\,(r) = \alpha\,(1 - r) = \alpha\,(\alpha) = \alpha^2 \ldots\ldots (24)$$

The same process continues until there is no more excess reserve to loan out.

The value of the fifth deposit will be:

$$\alpha^3 - \alpha^3(r) = \alpha^3(1 - r) = \alpha^3(\alpha) = \alpha^4 \ldots (25)$$

In general, we can write out a geometric series that represents the total change in the money supply - Ms after n deposits resulting from the deposits of a single naira, thus.

$$\Delta M = 1 + \alpha + \alpha^2 + \alpha^3 + \ldots\ldots + \alpha^{n-1} \ldots\ldots,\ldots (26)$$

Taking the sum we have:

Ms = $1/1 - \alpha$, but $\alpha = 1 - r$

$$\Longrightarrow \Delta M = 1/r \qquad \ldots\ldots\ldots (27)$$

where ΔM = change in demand deposit

r = legal reserve ratio

Ms = money created.

2.2.2 Determinants of Nominational Money Supply

The result above is as a result of the restrictive assumptions that were made. They are not realistic enough. The actual behaviour of the public and commercial banks go a long way affecting the money supply in the economy.

Below is a model showing the joint behaviour of the Central Bank, commercial banks and the public in determining the total money supply.[23]

We know that

$$Ms = C + D \quad \ldots\ldots\ldots \quad (28) \qquad \text{(by definition)}$$

$$\text{and} \quad H = C + R \quad \ldots\ldots\ldots \quad (29) \qquad \text{(by equation [22])}$$

where Ms = nominal money supply

C = nominal currency

D = nominal demand deposits

H = nominal supply of high-powered money

R = nominal reserves of the commercial banks.

Divide both sides of (29) by Ms,

$$H/Ms = C/Ms + R/Ms \quad \ldots\ldots\ldots \quad (30)$$

$$\text{But } R/Ms = R/D - R/D + R/Ms \quad \ldots\ldots\ldots \quad (31)$$

Multiply the second and third terms on the right hand side of (31) by Ms.Ms and D/D respectively, we have:

$$R/Ms = R/D - Ms/Ms\ R/D + RD/MsD \quad \ldots\ldots\ldots \quad (32)$$

$$= R/D - R(Ms-D/MsD$$

From (28), $Ms - D = C$

Substituting C for Ms - d in the above

$$R/Ms + R/D - CR/MsD \quad \ldots\ldots\ldots \quad (33)$$

Subtitute (33) into (30)

$$H/Ms = C/Ms + R/D - CR/MsD \quad \text{..... (34)}$$

Divide (34) by H and take the reciprocal, we have:

$$Ms = \frac{H}{C/Ms + R/D - CR/MsD} \quad \text{..... (35)}$$

Expression (35) is the nominal money supply held by the public in terms of the behaviour of the Central Bank, commercial banks and the public. The money supply is directly related to the exogenous expansion in the amount of high-powered money. To know the relationship between the money supply and the public and commercial banks behaviours, let us examine briefly the behavioural model of money supply determination.

2.2.3 A Behavioural Model of Money Supply Determination

The behavioural model of money supply can be explained by viewing the banking system as a firm which produces an output of banking services which can, for simplicity, be regarded as varying directly with the volume of bank deposits created by the bank. The costs of a bank is comprised of (a) real resource costs of employing capital and labour to manage and operate bank accounts and bank loans, (b) interest payment banks need to pay in order to attract deposits and, hence, gain reserves against which bank loans can be extended.[24] The bank's cost function can be written as:

$$C = C(D) + D_{iD}{}^{T} \quad \text{..... (36)}$$

where C = bank costs

C(D) = real resource costs, a function of total volume of deposits and $\partial C / \partial D > 0$

D^T = volume of time deposits

iD = interest on time deposits

D = volume of time plus sight deposits

The bank's revenue depends on the level of bank charges, a , it levies per unit of sight deposits and on the interest rate obtained on bank loans, iL since

Loans = deposits minus cash reserves

= D - R, but r = rD

= D - rD = D(1 - r)

$$\therefore \text{Revenue} = aD^s + D(1 - r)_{iL} \quad \ldots\ldots \quad (37)$$

$$\text{and } II^B = [aD^s + D(1-r)_{iL}] - [c(D) + D^T iD] \ldots \quad (38)$$

where D^s = sight deposits

Π^B = bank profits

The profit maximizing conditions for this firm is obtained by taking the derivative of the Π function with respect to deposits:

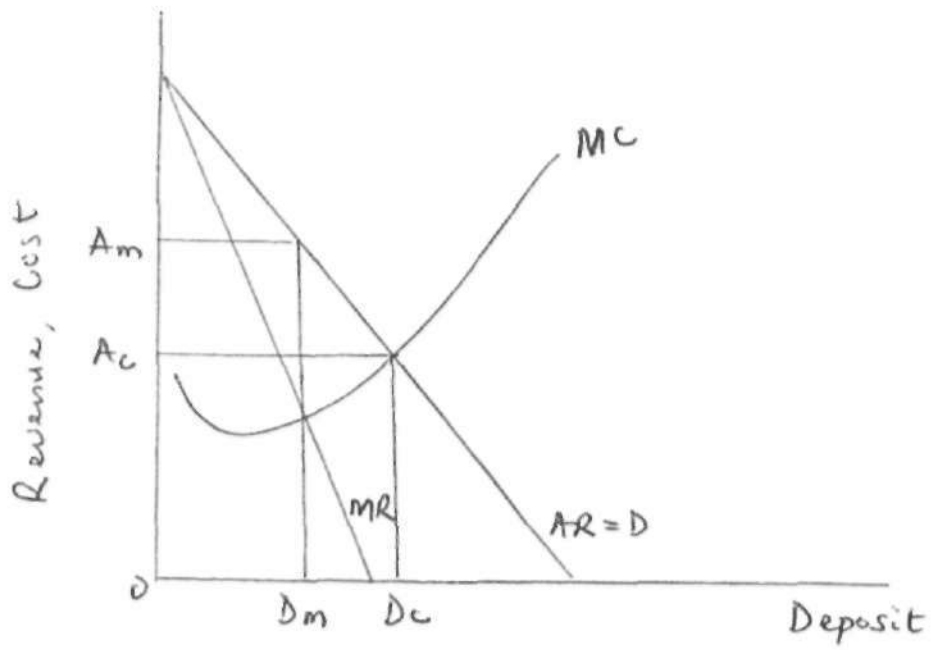
$$\frac{\partial \Pi^B}{\partial D} = \left[\frac{a\,\partial D^s}{\partial D} + (1-r)iL\right] - \left[\frac{\partial C}{\partial D} + \frac{\partial D^T_{iD}}{\partial D}\right] = 0 \ldots(39)$$

The first expression on the right hand side of (39) is the marginal revenue, while the second is the marginal cost.

If we assume the high-powered money to be constant, and exogeneously given, we can show how these banks influence

the total amount of money supplied and the currency held by the public. The banking system can only raise kits volume of deposits by raising the interest rate on time deposits, which stimulates the public to deposit more of their cash in the bank and reducing the currency held. This action raises the marginal cost of the bank as shown in the diagram below.

FIGURE 2.2: **THE BANKING INDUSTRY: DETERMINATION OF THE QUANTITY OF BANK DEPOSITS**



The average revenue function can be derived by introducing the demand by borrowers for bank loans. The demand for bank loans is inversely related to the rate of interest, so if expected future profit increases too, the demand for credit increases.

Hence, $L^D = f(iL, X)$; $\partial L^d / \partial iL$, 0 ..... (40)

where: L^D = demand for loans

iL = interest on loans

X = all other factors influencing the demand for bank loans, taken to be constant in this situation.

The banking system can only expand loans and, hence, deposits by lowering the lending rate. That makes the average revenue to be downwardly sloping as deposits are expanded as in the figure. A competitive bank will expand deposits up to the level where marginal cost is equal to the average revenue, point DC above. If the banking industry is a monopoly, then the industry marginal revenue will be lower than the average revenue function. Unlike the competitive banking system, they equate their marginal cost to the marginal revenue at Dm which yields a higher loan rate of Am and a lower deposit rate of Ac than that of the competitive banking industry.[25]

Given an exogeneously high-powered money, and ceteris paribus, bank reserves can only be increased through high interest rate on time deposits. The public will now be induced to hold less cash and more in deposit form. The bank's MC, therefore, increases, and deposits increase and both deposit and loan rates will rise. this leads to a fall in currency deposit ratio, because their rates of interest have increased. This leads to an increase in the value of the multiplier. Hence, this behavioural relationships make the money multiplier a variable and make the money supply

vary directly with the demand for bank loans.

On the other hand, if the public now has a higher taste for currency, the marginal cost may shift up to the left, meaning that the bank will have to pay a higher deposit rate to attract deposits. The loans rates would rise along an unchanged bank average revenue function, causing a fall in the demand for loans, and consequently, a fall in total deposits.

Lastly, if the assumption of fixed high-powered money is relaxed and it is increased by the monetary authorities, then banks would need to pay less to depositors to attract a given volume of time deposits, since their reserves would have been increased by the action of monetary expansion. This leads to a fall in marginal cost, shifting to the right, lowering their lending rate, increasing the demand for loans and a consequential expansion in the amount of deposits, increasing the money supply.

2.3 MONEY SUPPLY AND INFLATION

Amoung the most hotly disputed subjects of economics among various economists is the relationship between the supply of money and the inflation rate. It has been criticised that the assumptions made about the constancy of V and T are unrealistic, and so changes in the supply of money can not lead directly to changes in prices in a proportional way.[26]

In another version, Chandler remarked about the view of the quantity theorists, "Most quantity theorists have held that the long run effect of an increase or decrease in the money supply is to cause the price level to be proportionately high or lower than it would have been if the volume of money had not been altered. They do not contend that a given increase or decrease in M will necessarily be followed by an actual proportional rise or fall of P; such a movement may be prevented by changes in V and/or T, that are in no way connected with the changes in M.[27] He argued that a change in M will only change P but not proportionately. Arthurwoll (1980) argued that given a constant V and T, a change in the stock of money will result in a proportionate change in the price level. The argument of Ford and Chandler is based on the fact that an economy which is operating at below full-employment can not experience an inflation rate proportional to changes in money supply. Chandler further argued that even in those cases where the rise in the general prices is initiated by an enlargement in the quantity of money, all individual prices are not affected uniformly. In addition, that in the transition period, an induced increase in the money supply serves to enhance the velocity of money, the physical volume of trade, and prices. Whether the resulting price rise will be in proportion to the money increase or will be more or less than in proportion depends upon the relative movements of V and T. If both rise at the same rate, P and M will move

proportionally. If V rises faster than T, P rises faster than M. If V rises more slowly than T, P rises faster than M.[28]

In his "Optimum quantity of Money", Friedman asserted that, to the best of his knowledge, there is no instance in which a substantial change in the stock of money per unit of output has occurred without a substantial change in the level of prices in the same direction. Furthermore, he pointed out that the statistical connection itself, however, does not tell anything about direction of influence. But generally, a substantial change in the stock of money is both a necessary and sufficient condition for substantial changes in the general price level.[29] He did not come out to say that there exists a proportional relationship between them; he was of the opinion that they go in the same direction. The relationship between changes in the stock of money and changes in prices while close, is not, of course, precise or mechanically rigid. the factors that produce discrepancies are changes in output and changes in the amount of money that the public desires to hold, relative to its income.

According to him, evidence abounds that there is a direct relationship between the money stock and price levels, even though the relationship is not a one-to-one type. Examples include the World Gold inflation of 1897 - 1914. In the United States in 1896, gold stock rose form

$502 million to $1,891 million in 1914. This represented an average annual growth rate of 8.25%. This increase was accompanied by an average annual growth in the wholesale price index of 2.3% from 1897 to 1914. Another example is the German hyperinflation of 1922 - 1923. By printing more currency in 1922, when inflation was increasing at a rat of 50% per month. By the time this inflation ended in November 1923, the price level had risen by a factor of 1.02×10^{10} and the money supply had increased by about 7.3×10^{9} times.[30]

In his article, "A Primer on Inflation", A. C. Harberger asserted with great confidence that monetary expansion is in a sense the proximate cause of inflation, but that one should not be too smug about it, for it only pushes the explanation one step back. The reason being that money supply does not just increase indiscriminately, but is pushed by something else, which is the attempt by the government to finance her deficits through borrowing from the banking system. According to him, if the government tries to increase its debt to the banking system faster than the non-inflationary growth rate, then trouble of one kind or another usually ensues. A government borrowing from the banking system at a rate more rapid than that compatible with stable prices is going to have to expand the money supply at an inflationary pace. This has been the historic sources of nearly all chronic and acute inflation.[31]

Harberger (1963) conducted a research work on Brazil for the period 1947 - 1962 on the factors that determine inflation and has also discovered that there is a direct relationship between the money supply and inflation.[32]

Some adherents of the monetarist view or demand-pull have asserted that the cause of inflation is an increase in money demand or too much money chasing too few goods. Rather than responding passively, as some cost-push advocates have asserted, the monetary authority actively determines the rate of inflation by permitting an excessive rate of increase in the nominal stock of money.[33]

They posited that if the monetarists are correct and inflation is primarily demand-pull, one should find a unidirectional causal chain running from the stock of money to prices. As stated by Christopher Sims, the test for unidirectional causality between X and Y is "to regress Y on past and future values of X - then if causality runs from X to Y only, future values of X in the regression should have coefficients insignificantly different from zero, as a group". To apply this test, they collected seasonally adjusted quarterly data for the narrow definition of money stock (M_1) and the wholesale and consumer price indices. On the basis of the empirical evidence obtained by employing Sim's test for causality. It was shown that there is a one-way causal link that runs from money to wholesale and consumer prices.[34]

These findings support the monetarist view that inflation during the post-World War II period was caused by increases in the money supply and was thus primarily a demand-pull rather than a cost-push phenomenon. These results agree with Friedman's assessment that "Long-period changes in the quantity of money relative to output determine the secular behaviour of prices. Substantial expansion in the quantity of money over short periods have been a major proximate sources for the accompanying inflation in prices.[35]

Studies on inflation in Kenya by Adongo (1978) and Killick (1984) show that import prices do not significantly affect inflation. The empirical study by Adongo shows that money stock lagged was a statistically significant variable explaining inflation in Kenya.

Other studies are that Kiptui (1989), Mwega (1990) and Nganda (1985). Kiptui's study identifies the real growth in money stock (M_1) and the change in import prices as important variables affecting inflation. Other variables identified by Mwega are money supply and import prices.

There had not been much literature on the Nigerian inflation until 1974, when the Nigerian Institute for Social and Economic Research (NISER) organized a conference on inflation in Nigeria, during which several faces of the subject matter were addressed.

Ajayi and Teriba (1974) developed a general quarterly model of about eight equations to evaluate the relative contribution of the different factors that affect inflation during 1960 - 1972. Among the equations are:

$$P = f(M_{st}) \quad \ldots\ldots\ldots\ldots \quad (1)$$

$$P = f(M_{st}, M_{st-1}, Y/P, A) \quad \ldots\ldots\ldots\ldots \quad (2)$$

$$P = f(M_{st}, M_{st-1}, Y/P, A, EXP/GDP) \quad \ldots\ldots\ldots \quad (3)$$

$$P = f(M_{st}, M_{st-1}, Y/P, a, IMP/GDP) \quad \ldots\ldots\ldots \quad (4)$$

where P = change in P

M_{st} = money supply at time t

Y = income

A = past changes in the rate of inflation

EXP/GDP = export-income ratio

IMP/GDP = import-income ratio

Their result reveals that money supply is not always a significant determination of inflation and that the adjustment process is rather low. Ajayi (1978) later obtained a strong relationship between money supply and inflation in another study.

Adeyokunmu and Ladipo (1974) conducted a quantitative impact of money supply, import duties and GDP on inflation rate, using the following models:

$$Y = f(X_1, X_2, X_3, U) \quad \text{(Linear form)}$$

and $\log Y = a_o + a_1 \log X_1, + a_2 \log X_2 + a_3 \log X_3$ (logarithmic form)

where Y = CPI for Ibadan

X_1 = money supply

X_2 = import duties

X_3 = GDP

U = residuals

The results of both the linear and logarithmic specification show that money supply contributed significantly to the inflationary process in the city at the period between 1960 and 1973.

In a study conducted by Ojo (1974) on the relative contributions of both the structural elements and monetary factors in inflation in Nigeria, when regressed together, it was observed that both factors were responsible for inflation in Nigeria in the twenty years, 1953 - 1972. when the two factors were treated separately, monetary variables performed fairly better than the structural elements.

Owosekun and Odama (1974) employed the model of Arnold Harberger, which was applied to Chile, in the Nigeria inflationary situation. The model they used was similar to that used by Adeyokunmu and Ladipo in their linear specification.

$$P_t = \alpha_o + \alpha_1 M_t + \alpha_2 M_{t-1} + \alpha_3 Y_t + \alpha_4 A + U$$

where P_t = rate of inflation

M_t = percentage change in real money supply

Y_t = percentage change in real GDP
(1962/1963 factor cost)

A = cost of holding money defined as P

The result could not support the 'a priori' expectation. A modified version was again used together with other variables like aggregate demand, price expectation and cost elements. The result proves significantly different, but the price level is affected after a year.

Adejugbe's (1974) empirical investigation into the causes of inflation in Nigeria for the period 1962 to 1972 employed two set of equations: the static and the dynamic. In the static, he examined the impact of the variables generally. In the dynamic equations, he attempted to measure the influence of these variables through time. Thus, we have

(1) Static:

$P = A_o + A_1M + A_2Y + A_3T_{rv} + A_4W + U$ (linear_

$\log P = A_o + A_1 \log M + A_2 \log Y + A_3 \log T_{rv} + A_4 \log W + U$ (logarithmic)

where P = average price index

M = money supply

T_{rv} = trade restriction variable taken as the percentage of import duty to the value of imported goods

W = average wage level

(2) Dynamic model:

$P_t = A_o + a_1M_t + A_2M_{t-1} + A_3N_{t-2} + A_4Y + U$ (linear)

$\log P_t = A_o + A_1 \log M_t + A_2 \log M_{t-1} + A_3 \log M_{t-2} + A_4 \log Y_x + U$ (semi-log transformation)

$\log P_t = A_o + A_1M_t + a_2M_{t-1} + A_3M_{t-2} + A_4Y + U$ (inverse semi-log function)

where Y = value of Nigeria's export used as surrogate for GDP

He used both quarterly and annual data, and the results reveal that both money supply and real output contributed significantly to price movement. He then recommended that the domestic money supply be regulated, while the output should be expanded in order to effectively control inflation.

Studies by Nwankwo (1974) and Oyejide (1972) brought to light the impact of deficit financing in the course of inflation in Nigeria. Oyejide (1972) defined deficit financing as the net increase in the amount of money in circulation where such an increase results from a conscious governmental policy designed to encourage economic activities, which would otherwise not have taken place. He defined budget deficit in a broad sense as the amount by which the total government current and capital expenditure is greater than the total revenue. he then pointed out six ways of financing a budget deficit (i) net borrowing from the Central Bank, issue of new currency, (ii) net borrowing from the commercial banks, (iii) net borrowing form non-bank financial intermediaries, (iv) net borrowing form the public, (v) draw down of foreign assets, and (vi) net borrowing from abroad. To derive a model that links deficit financing with inflation in Nigeria, he worked with the equation of exchange of the quantity theory:

$$PQ = MV$$

$$V = PQ/M$$

Differentiating, we have $1/v\ dv/dt = 1/p\ dp/dt + 1/Q\ dQ/dt -$

findings of Ajayi and Awosika (1980) that inflation in Nigeria is determined by developments in the external sector, but complemented by internal influences. Hence, their findings show a high correlation between the openness of the economy and inflation.

London (1989) conducted a recent study of inflation, considering Nigeria along with other twenty-two African countries. The simple version of the pure monetarist model of the Harberger-type was employed:

$$P = a_o + a_1 M_{t-b} Y_t + C\ (P_{t-1} - P_{t-2}) \quad \ldots\ldots\ (1)$$

He defined equation one as the inflationary process in a simple Harberger type. He pointed out that expression (1) does not say that one can go directly form the rate of monetary growth to a computation of the inflation rate, except in a 'ceteris paribus' situation, that is, when Y_t and $(P_{t-1} - P_{t-2})$ are held constant. He again said that it assumes instantaneous adjustment of inflation to changes in the exogenous variables. That shows that it reflects a long-run condition when all adjustment have been completed. But in the short-run, the adjustment can not be said to be instantaneous, particularly in view of the observed short-run tendency of real money balances to rise following an increase in the money stock. He then further went ahead to put into consideration that short-run dynamics by introducing lagged monetary growth into the equation, much as harberger (1963) and later Saini (1982) have done. Moreover, as to allow for the possibility of different

speeds of adjustment of inflation to changes in the exogenous variables, the lagged values of the other exogenous variables are included, to give:-

$$P_t = a_0 + a_1M_t + a_2M_{t-1} - b_1Y_t - b_2Y_{t-1}$$
$$+ C_1(P_{t-1} - P_{t-2}) + C_2(P_{t-2} - P_{t-3})$$

In a steady state, the inflation process defined by this model becomes:

$P_t = (a_1 + a_2)M_t - (b_1 + b_2)Y_t$, where $(a_1 + a_2) = 1$ and $(b_1 + b_2) = b$, since in steady state, all rates of growth are assumed constant. The results demonstrate that for the period between 1974 and 1985, the growth of money supply, expected rate of inflation and real income were significant determinants of inflation in those countries.

Because of the adjustment process being undertaken by some of the African countries, and the influence of the external sector on the domestic price, he introduced exchange rate, because of the impact of devaluation on the domestic price. Also, in keeping with small open economy maxims, a foreign price variable should be added, especially in a time series country-specific regression. He then used the US CPI as a proxy for the foreign price variable, because USA is one of the major trading partners of these countries and the changes in their outputs being sold to these countries is transmitted to the domestic price level, and hence, the model becomes:

$$P_t = a_o + a_1M_t - b_1Y_t + C(P_{t-1} - P_{t-2}) + C_1e_t + C_2P_f.$$

The inclusion of exchange rate into the model significantly affect the result of the other model and it rendered the impact of money supply growth to the barest minimum in the course of inflation in the African countries.

This conclusion seems to reflect the findings of Ndekwu (1987) and Ajakaiye (1987) about the proximate causes of inflation in Nigeria. Ndekwu classified the inflationary trend into the pre-adjustment (1980/84) during which monetary expansion was the main determinant of inflation and the adjustment period (1984/87) in which cost push inflation, induced by the depreciation of the naira, rising interest rates, and other cost elements were predominant. Argued also is the fact that since monetary inflation was more prevalent during the growth process than cost push inflation, elements of monetary inflation could also be present during the period of adjustment.

Ojameruaye (1988) conducted an analysis of the determinants of the general price level between 1960 and 1984 on a model of ten equations, among which five of the equations are stated below:

$$CPI = f(Ms, U)$$

$$CPI = f(Ms, M_{s-1} \; U)$$

$$CPI = f(GBD, GBD_{-1}, \; U)$$

$$CPI = f(Ms, GDB, BSC\ Ps, BSCGS, U)$$

$$CPI = f(ER, FER, IMR, IM, IOE, U)$$

$$CPI = f(Ms, IAP, SA, PM, MBLR, PCI, U)$$

where CPI = consumer price index

Ms = money supply index.

GBD = government budget deficit

BSCGS = banking system credit to the government sector

ER = average exchange rate

FER = external reserves of the CBN

IAP = index of agricultural product

SA = salary dummy

PM = Nigeria's import price

MBLR = maximum bank lending rate

PCI = Nigeria's per capita income

IM = merchandise imports

IOE = index of openness, defined as the import-current GDP ratio

The results show that money supply is a significant variable in explaining the price movements. He also discovered that the lagged money supply is not significant at any reasonable level. The regression of the CPI on the budget deficit in the current year is significant at 1 per cent while its lag is significant at 10 per cent level. His result on the coefficient of the exchange rate and import restrictions show signs contrary to the 'a priori' expectation. He could not give any reason for the behaviour of the coefficient of the exchange rate in his regression result.

2.4 THEORETICAL FRAMEWORK

As defined in the introductory aspect of this work, inflation can be seen as a persistent rise in the general price level, as measured ordinarily by some index numbers of prices. The various factors that lead to price increases have also been dealt with in Section 2.1 of this chapter. Quite a number of arguments have erupted as to which of the causal factors is most important in giving rise to a persistent price rise. Various schools of thought have declared boldly why and how each of their proposed factors could lead to inflation. This research work has adopted the pure monetarist approach; which has argued that what is important in affecting both the economic activities and the price level is the manipulation of the monetary variables. The model to be used will be built from the monetarist approach using the quantity theory of money, because it will help in testing the significance of the monetary variables to be used.

In this theoretical setting, attempts are made to look at the factors that the monetarists have considered to have arrived at their stern conclusion that "only money matters" in an economy. We shall go ahead to see how the model for this research work has been built from the theory.

Glahe (1973) has logically presented the theoretical backing for each of the school of thought; the monestarist, Keynesian and the neo-Keynesian, about the importance of

money. According to him, the popular phrase "only money matters" is based on the joint validity of particular assumptions about the demand for and the supply of money. They are both assumed to be perfectly interest-inelastic, what we refer to as the exogeneity of money.[36]

The argument of the monetarists goes thus: Given a level of the real money supply and the level of demand for money at certain income levels. By the assumptions above, money demand and supply do not change along with changes in the level of interest rate. Hence, they will jointly produce an equilibrium in the money market, which is independent of the rate of interest. To get the general equilibrium, we need also the equilibrium in the goods market which, together with the money market equilibrium, yield the general equilibrium level, which we call the aggregate demand in the economy. The full employment level yields what is called the aggregate supply level. The equilibrium of the aggregate demand and supply determine jointly the national income and the price level.

Given the conditions above, an increase in the equilibrium in the goods market will only lead to an increase in the rate of interest, with little or no impact on the income and price level. We then say that the impact of the fiscal policy on the government spending multiplier is zero, indicating that fiscal policy does not matter.

On the other hand, supposing the government decides to increase the nominal money supply through the Central Bank, money supply will increase resulting in an increase in the equilibrium in the money market. The equilibrium in the money market now meets with the original equilibrium in the goods market at full-employment, which results in a higher aggregate demand than when the fiscal policy was embarked upon. As a result of this government decision, the aggregate demand meets with the aggregate supply at a higher level of national income and price level. This tends to bring home the argument of the monetarists, that only money matters in an economy in effecting a significant change in the economic activities and price level.

The argument of the Keynesians is that money supply is perfectly endogeneous or interest elastic as opposed directly to the monetarist view and so assert that money does not matter.[37] The neo-Keynesians argued that the two extreme positions are dangerous, so they maintain a midway between the two extreme opinions.[38]

To further buttress the argument of the monetarists on the exogeneity of the demand for and the supply of money, several studies were conducted by various authors and they have used both the broad and the narrow definitions of money in their analysis. They also used short-term interest rate, and the long-term interest rates, such as the Aaa corporate bond rate.

TABLE 2.1 [A]: THE INTEREST ELASTICITY OF THE DEMAND FOR MONEY: A SUMMARY OF EMPIRICAL FINDINGS

AUTHOR	DATA USED	DEF OF MONEY	INT. RATE	INT. ELASTICITY
Bronfen-brenner & Mayer	Annual, US, 1919-56	M_1	Short	-0.33
Chow	Annual, US, 1897-1958	M_1	Long	-0.73
Meltzer	Annual, US, 1900-58	M_1	Long	-0.92
		M_2	Long	-0.48
	Annual, US, 1930-59	M_1	Long	-1.15
		M_2	Long	-0.70
Brunnor & Meltzer	Annual, US, 1930-59	M_1	Long	-1.09
		M_2	Long	-0.73
Laidler	Annual, US, 1919-60	M_1	Short	-0.21
		M_2	Long	-0.72
	Annual, US, 1892-1960	M_2	Short	-0.16
		M_2	Long	-0.25
Lee	Annual, US, 1951-65	M_1	Short	-0.41
		M_2	Short	-0.67
Motley	Annual, US, 1920-65 (households only)	M_2	Short	-0.16
Courchene & Shapiro	Annual, US, 1900-58	M_1	Long	-1.00
		M_2	Long	-0.58
Teigen	Quarterly,US,1946-59	M_1	Short	-0.07
	Annual, US, 1924-41	M_1	Short	-0.21
Fisher	Quarterly,UK,1955-67	M_1	Short	-0.11
		M_1	Long	-0.3
Bank of England	Quarterly,UK,1955-69	M_1	Short	-1.05
		M_1	Long	-0.80
		M_2	Short	-0.09
		M_2	Long	-0.35

SOURCE: Extracts from Tables 14.1 and 14.2 in Glahe, F.R. on "How much money matters", Macroeconomics: Theory and Policy, University of Colorado.

TABLE 2.1 [B]: THE INTEREST ELASTICITY OF THE SUPPLY OF MONEY: A SUMMARY OF EMPIRICAL FINDINGS

AUTHOR	DATA USED	DEF OF MONEY	INT. RATE	INT. ELASTICITY
DeLeeuw	Quarterly,US,1948-62	M_1	Short	0.25
deLeeuw & Turek	Quarterly,US,1948-62	M_1	Short	0.22
Goldfield	Quarterly,US,1950-62	M_1	Short	0.22
Goldfield & Kane	Weekly, US, 1955-63	M_1	Short	0.21
Teigan	Quarterly,US,1953-64	DD	Short	0.14
Brunner & Meltzer	Annual, US, 1949-62	M_1 M_2	Short Short	0.66 0.72
Rasche	Quarterly,US,1965-69	M_1	Short	0.24

SOURCE: Extracts from Tables 14.1 and 14.2 in Glahe, F.R. on "How much money matters", Macroeconomics: Theory and Policy, University of Colorado.

It is a consensus that there is an inverse relationship between the demand for money and interest rates and that the interest elasticity of demand is rather low.[39] If we limit our analysis to the definition of money defined in this research work and also use short-term interest rates, since they are on 'a priori' grounds the most relevant to Keynesian liquidity preference theory, we would obtain from Table 2.1A an average interest elasticity to be -0.33. This result supports neither the Keynesian nor the monetarist views. The estimated interest elasticities also appear to be too low to support the Keynesian view of a perfect interest elasticity of demand for money.

Considering the Table 2.1B, the results range between 0.72 and 0.14, with the median elasticity of 0.22, this results have falsified the claim of the Keynesian of a perfectly endogeneous money supply. Although it does not perfectly agree with the perfect exogeneity of money supply as claimed by the monetarists. Integrating the two results on the supply of and the demand for money, it tends to produce the type of hypothesized LM curve by the monetarists. These empirical researches on the interest elasticities of the demand for and supply of money tends to support the monetarist position.

It is in the light of the relative importance of money discussed that we will want to situate the heart of this research within the monetary framework, and most important of all build the model to be used on the restated quantity theory of money. The traditional and the cambridge approaches to the quantity theory have been discussed in the literature review.

Recent studies in the quantity theory of money have come out to admit that it is a study of the demand for money. The cambridge cash-balance approach was built upon by one of the leaders of the monetarists, Professor Milton Friedman, who had agreed with the quantity theorist, Irving Fisher, that in the long-run, the price level depends on the quantity of money. The quantity theory is in the first instance a theory of the demand for money. It is not a theory of output, or of money income, or of the price level. Any statement about these

variables requires combining the quantity theory with some specifications about the conditions of supply of money and perhaps about other variables as well (Friedman).[40] In his work, demand for money is a problem to be studied in the framework of portfolio composition. Thus, the variables that explain the demand for money include Income, Wealth, Rates of return on a variety of assets like bonds, equity, physical goods (representing the opportunity cost of holding money).[41]

$$Md = f(P, rb, re, 1/p\ dP/dt; W; Y; U) \quad .... \quad (41)$$

The functional relationship above is said to be homogeneous of the first degree in price and income. Considering the homogeneity in P, the function becomes:

$$M/P = f(rb, re, 1/p\ dP/dt; W; Y/P; U) \quad .... \quad (42)$$

which is an expression of the demand for real balances as a function of real variables independent of the nominal monetary values. If re, rb, 1/P dP/dt = r, and because of the difficulty of measuring wealth, we ignore W, then the equation becomes: $M/P = f(r, y, u)$ ..... (43)

where U = random disturbances like tastes, preferences or any other variables that can affect tastes and preferences.

Taking the logarithm of (43)

$$\log (M/P) = a + b_{1r} + b_2 \log y \quad ..... \quad (44)$$

Expression (44) stands for the demand for cash balances in real terms,

where M = index of the money supply

P = price index

r = rate of interest (opportunity cost of holding money)

y = real income

This was the theoretical modelling that Harberger used when he conducted an inflation model and a test for the inflationary situation of Brazil and India.[42]

Differentiating the above equation (44) with respect to time, we have

$$d(\log M)/dt - d(\log P)/dt = a + b_1 dr/dt + b_2 d(\log y)/dt \quad .. \quad (45)$$

$$= d(\log P)/dt = d(\log M)dt - a - b_1 dr/dt - b_2 d(\log y)/dt \quad .. \quad (46)$$

The model which he used in his empirical work is obtained by substituting dA/dt for dr/dt and rearranging

$$d(\log P)/dt = a + b_1 d(\log y)/dt + b_2 d(\log M)/dt + b_3 [d(\log M)/dt]_{-1} + b_4\, dA/dt + b_5\, d(\log W)/dt \quad .... \quad (47)$$

where W = wage variable.

Because of the insignificant role of wage variable in this analysis, it can, thus at best, be assigned a residual explanatory variable. He also claimed that the introduction of M_t and M_{t-1} captures all the lagged explanatory power of changes in the money supply on variations in P_t.

In a study conducted by Owosekun, A. and Odama, J.S. on the causes of inflation in Nigeria, some empirical evidence,[43] they started by applying Nigeria data to the pure monetarist model of Harberger developed above, which can be rewritten as:

$$P_t = \alpha_o + \alpha_1 M_t + \alpha_2 M_{t-1} + \alpha_3 Y_t + \alpha_4 A + U \quad \ldots \quad (48)$$

In another study carried out by Adeyokunmu, T. and Ladipo, O.O. on the causes of inflation in Nigeria, Quantitative Assessment,[44] a functional relationship was postulated between price level Y and the factors that seem to affect it, like money supply, X_1, GDP, X_2, and export duties, X_3, so that

$$Y = f(X_1, X_2, X_3, U) \quad \ldots\ldots \quad (49)$$

where U = residuals

They wanted to incorporate variables like unemployment and wages in the model, but there was no time series data on them.

In a linear form, the functional relationship becomes:

$$Y = a_o + a_1 X_1 + a_2 X_2 + a_3 X_3 + U \quad \ldots\ldots \quad (50)$$

Models (48) and (50) take the same form, because of the theoretical foundations which stemmed from the monetarist philosophy.

2.5 CONCEPTUAL LINK

The conceptualisation of the linkage between the stock of money and the price level is quite explicit and well known (as discussed above in the literature review). Likewise, that between exchange rate and budget deficit, on the one hand, and

between each of these variables and inflation, on the other, is relatively straightforward and will be discussed here.

This linkage is simply the channel of transmission between exchange rate and inflation. The argument is hinged on the "pass-through" effects from exchange rate changes to the domestic prices. This is the basis on which the argument of inflationary tendencies of devaluation is premised. This is predicated on the assumption that the induced increases in the prices of imported inputs and final goods following a devaluation will be passed on to domestic prices. There are basically two ways to obtain indication from these effects. From direct estimates of pass through effects and estimates of the relevant trade elasticities. It is obvious, therefore, that this proposition has its roots in the cost-push theory of inflation. Generally, in the LDCs, there is high dependence on imported inputs for production. Therefore, devaluation of a domestic currency raises the domestic prices of imported inputs, hence, production costs are accordingly affected. Profits plus indirect taxes are usually mark-ups on producer prices to arrive at exfactory prices and exfactory prices plus distributors' margins equal market prices. Thus, prices are formed on the basis of mark up over cost of production. This relationship is modelled as:

$$P = M(W + eP^*)$$

where P = outprice

M = 1 plus the fixed mark-up rate

W = wage rate

e = exchange rate

P* = foreign price of imported inputs

The equation assumes a constant mark-up. But the argument has been advanced that the size of the mark-up is a function of excess demand in the economy (Chibber, et al, 1990: 7).[45]

Consequent upon this is the fact that the devaluation that results in inflation causes the real wage rate to fall and because of the increase in the cost of living, labour has to agitate for increases in wages and benefits. When granted, production costs are pushed up and the market prices are again influenced directly. In countries where government is the major employer of labour, an increase in wages will raise the public outlay. This will result in fiscal deficit when the revenue is not adequate to meet the expansion in government expenditure.

If the resulted fiscal deficit is financed from an increase in Central Bank credit to the government, it has two direct effects: first, an increase in bank credit has an expansionary effect on aggregate demand. Because of the inelasticity of supply to meet up the demand, the demand exceeds supply and a sustained rise in the general price level results inevitably. Secondly, an increase in bank credit results in money supply, through the money base and, hence, leads to increase in inflation.

Another way in which fiscal deficit engenders inflation according to the monetarists is when the CBN conducts monetary policy by regulating interest rate movements rather than money supply. In an attempt to finance her deficit, the government competes with the private sector for the scarce loanable funds. This helps to raise the rate of interest. Under this condition, there is a tendency for the CBN to increase money supply (to reduce the interest rate) in which case, deficits ultimately cause inflation by stimulating monetary expansion.

The relationship between the exchange rate and budget deficit has been simplified by Chibber, et al (1989). Exchange rate movements affect both the revenue and expenditure sides of the budget. When there is devaluation, for instance, external debt and debt service payments in domestic currency are raised. Thus, a component of the overall public expenditure is raised. Theoretically, because devaluation stimulates export production (for an economy that has a high elasticity of export) it raises the income of exporters and, subsequently, increases revenue from taxes (Corden, 1989). In short, revenue from export duties are raised with increased export production as a result of devaluation of the exchange rate. The extent to which the volume of import would decrease is a function of the price elasticity of demand. But Corden (1989) has argued that a devaluation raises the domestic currency value of government imports. Changes in the level of imports affect revenue from custom duties. However, the net effect of exchange rate on

the budget is largely a function of tax structure and expenditure. Should the net effect be fiscal deficit that is monetised, inflation results. Both government expenditure and revenue adjust to inflation disproprotionately and enlarged budget deficit is generated if expenditure adjusts faster than revenue. This discussion presents the mutual causation between exchange rate, inflation and budget deficit, as they feed on each other through the Keynes-Olivera-Tanzi effect (Tanzi, 1977).[46]

Based on these theoretical links explained above, some relationships is built on a block of model below which will be analysed with the use of a regression analysis.

The price equation can be accounted for by the monetary developments in the economy, output and developments in the external sector and certain variables of interest are exchange rate and foreign prices.[47] Thus:

$$P = f(M, Y, e, P^f, P_{t-1}, ED, M_{s-1}) \quad \ldots\ldots \quad (1)$$

$$\text{But } ED = \log(M/p) - \log(Md/p) \quad \ldots\ldots \quad (2)$$

$$M = f(MB, NFA, P, e) \quad \ldots\ldots \quad (3)$$

$$MB = f(BD) \quad \ldots\ldots \quad (4)$$

$$\text{But } BD = GE - GR \quad \ldots\ldots \quad (5)$$

$$\text{and } GR = PR + (OR + MR) \quad \ldots\ldots \quad (6)$$

$$MR = f(MQ, P^f, e, tr) \quad \ldots\ldots \quad (7)$$

$$GR = f(Y, GR_{-1}) \quad \ldots\ldots \quad (8)$$

$$PR = GR - MR - OR \quad \ldots\ldots \quad (9)$$

$$OR = f(GNP) \quad \ldots\ldots \quad (10)$$

$$IN = f(FD, e, rf) \quad \ldots\ldots \quad (11)$$

$$GE = f(Y/P, (GE/P)_{-1}, P) \quad \ldots\ldots \quad (12)$$

$$\text{but } OG = GE - IN \quad \ldots\ldots \quad (13)$$

where P = price level

M = money supply

Y = output or GDP

e = exchange rate

P_{t-1} = price level in the previous year

P_f = foreign prices

ED = excess demand

The specification of ED function is premised on Walras Law which equates excess demand in the goods market with excess supply in the money market. Using Chibber et al (1989), excess money supply is specified as the logarithmic difference of real money supply to real money demand, as in (2).

MB = money base

NFA = net foreign assets

BD = budget deficit

GE = government expenditure

GR = government revenue

PR = revenue from oil

MR = revenue from import duties

OR = revenue from non-oil other than other import duties

MQ = quantity of import

tr = tariff rate

IN = interest payment on external debt

FD = magnitude of foreign debt

rf = interest rate (foreign)

Doubtless to say is the interwoven nature of the various sectors of the Nigerian economy which necessitates the simultaneity of this models to capture the interworkings of the variables. The external sector variables especially, exchange rate movements affect prices, money supply and a component of expenditure and revenue. The expenditure, money, price and revenue have an adjustment lag to test their responsiveness to price movements. Fiscal deficit will increase if expenditure adjusts faster than revenue to the initial price increase. The budget deficit is a major determinant of high-powered money which, in turn, influences prices. This process continues through the various feedback mechanisms.

As a follow up of the discussion so far in the reviews of the literature, we have been able to link up the relationship that exists between the money supply and the inflation rate to be a direct one. Also, that the budget deficit is directly related to the price level, that the income is supposed to be inversely related to the price level. We have also seen that the foreign price (which we shall approximate here with the US consumer price index, being the closest price level we can use as a proxy for foreign price because of their trade relationship with Nigeria and because the domestic currency is

tied up to their own as a yardstick of measurement) is positively related to the domestic price, considering the degree of openness of the Nigerian economy. This view is supported by London (1989). Another variable that need to be included is the exchange rate. This variable became so vital in the determination of the price level in the second half of the 1980s, after the introduction of SAP, with the devaluation of the naira. Again, because of the openness and the trade liberalism policy under SAP, it is evident that this variable can not be ignored. The importation of the domestically needed inputs that will be paid in foreign exchange have to be done at a very high cost because of the devaluation that had taken place or that is taking place. That is why we have to include it. Because of the slow response of the price level to the changes in these variables, we consider the lagged values of money supply and budget deficit as good explanatory variables. Considering Nigeria as an economy, it is true that the price of any good that goes up hardly ever falls again. Because of the price increase last year, people are taught a lesson to buy this time around before the usual increase in price, thereby increasing the aggregate demand, which if not countered by increase in output will lead to increase in prices. Because of this, we will include the lag of the price level as an explanatory variable. Thus, we have the reduced form of the whole model expressed above to regress, and the model becomes:

$$P = f(M_s, Y, BD, M_{s-1}, BD_{-1}, P_{t-1}, P^f, e)$$

$I = f(M_s,\ Y,\ BD,\ M_{s-1},\ BD_{-1},\ P_{t-1},\ P^e,\ e)$

where I = percentage change in CPI and the explanatory variables are also percentage changes.

Several versions or combinations of the equations above shall be regressed. Because of the unavailability of adequate and appropriate data, we can not be able to solve the model earlier built simultaneously, but the single equations above will shed some light on our goals. This work is to update the previous work done in this area. Most of the papers so far on this area has either left out one or two of the variables, or stopped in 1987/88, but this research is to see the development in this area and to merge together most of the often isolated variables; in essence, it is to fill the missing gap.

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7. Full employment is that level at which it is by definition not possible to bring further workers into the labour force at any level of wages and where it is the limitation on the supply of labour only that prevents addition to the national rate of production.

8. See Appendix I.

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CHAPTER THREE

AN OVERVIEW OF MONEY SUPPLY AND INFLATION IN NIGERIA

The Nigerian economy has witnessed tremendous changes in money supply and inflation since independence. The trend in money supply and inflation is measured by the annual percentage change in the money supply and the consumer price index respectively. The section that follows highlights the general trend of money supply in Nigeria. It also discusses the components that contribute to the observed figures. The section that follows brings to light the inflationary trend in Nigeria and the various factors that led to the inflationary situations were also highlighted. Also highlighted were the several anti-inflationary measures embarked upon during the period under consideration.

3.1 THE TREND OF MONEY SUPPLY

The growth rate of money supply since independence in the first decade has been quite moderate with average annual growth rate of 4.5 per cent. The rate of increase became very noticeable when the civil war ensued in 1967. At the end of 1969, money supply figure was put at N429.8 million, about 30 per cent higher than the previous year. The trend continued in 1970 when the percentage increase was about 42.5 above that of the preceeding year. The trend fell sharply in 1971 to

about 3.4 per cent. Even though the magnitude of the total money supply has increased, the percentage change has fallen. And it picked up again in 1972 to 11.3% and 18.1% in 1973. For these five-year period, the annual average percentage change was about 21.1 per cent. Both components of the total money supply increased proportionately. This general rise in the money supply over this period of time was accounted for by the increase in government expenditure which was financed by credit from the banking system. The government expenditure increased dramatically because of the civil war. Especially, the monetisation of the war-affected areas after the war has stopped together with the ex-grantis payments. The factor that slowed down the rate of money supply in 1971 was the drastic fall in bank credit to the government. The net increase was about N-134 million. The credit to the private sector declined also by about 25.5% between 1970 and 1971. Another factor that was expansionary on the money supply was the monetisation of the foreign reserves.

This trend changed drastically in 1974 when the percentage change shot up to about 42.5%. This situation continued uptil 1977, even though the rate has started to decline. The average annual percentage increase was about 55.7%. The figure is more than double that of 1969 to 1973.

The major expansionary factors are: the substantial increase in credit to the government necessitated by the huge post-war commitments for reconstruction and rehabilitation. Another factor is the rapid monetisation of the foreign

exchange earnings from oil. These were further aggravated by the Udoji award of 1974/75, when there were sharp increases in the salaries and wages, accompanied by the payment of substantial arrears in both the public and private sectors. Thus, in the first four months of 1975, money supply increased by 46.7% compared with a rise of 9.2% of the same period of 1974.

Consequent upon these vast expansion of money supply is the expansion in aggregate demand, led by the growth of public expenditures. Indeed, during the oil boom, the Keynesian public-expenditure-led growth was pursued by the military government. The same effect does the expansion in the credit to the government has. It leads to expansion in aggregate demand and money supply. Since the demand could not be met by the domestic output level, the total import bills accelerated. This is one of the ways through which budget deficit generate deficit in the current account in Nigeria. Available statistics show that the Federal Government outlay which was approximately N839 million in 1970 climbed to N4.9 billion in 1975 and by 1980, it had shot up to beyond N14.0 billion. The inability of the revenue to meet up with the expenditure created persistent deficits. Between 1975 and 1978, the cummulative budget deficit was about N4.8 billion.

This pattern in the increase in the money supply was interrupted in 1978 because of a fall in the total credit that goes to the government. It dropped by about 33.7 per cent. Likewise is the credit to the private sector. In 1979, the

monthly average rate of monetary expansion was 1.7% against 0.5% in 1978. This further increased in 1980 to 4.2%. The factors that were responsible for the increase were the increase in the credit to the government and the continuing monetisation of the oil revenue. In 1980 especially, there was the three price increases. There was an increase of $4.21 or 14.0% to $34.18 per barrel effective from February 4, 1980. It was subsequently increased by $2.00 or 5.9% to $36.18 per barrel, effective June 1, 1980. All these increases affect the monetisation of the revenue which further led to an expansion in the money supply.

This trend was interrupted in 1981 when the percentage increase became 5.6 per cent from 50.6% in 1980. The main contractionary factor was the sharp fall in the foreign assets (net) of the banking system.

It fell from a tune of ₦5,607 million to ₦2,556 million, which represents over 50% fall. This decline was due to a heavy outflow and a reduced inflow of foreign exchange. The decline in the inflow of foreign exchange arose from the glut in the world petroleum market and it adversely affected Federal Government revenue and expenditure. Other factors were the decline in 'other assets' (net) of the banking system and an increase in quasi-money. The little expansion was made possible by the increase in bank credit. This same trend continued in 1982 when the annual change fell to 3.1 per cent. The same factors still explained the behaviour of the money supply in 1982 as it was in 1981.

Between 1983 and 1985, money supply increased but, at a decreasing rate. The government had to take about ₦5.2 billion for deficit financing as credit from the banking system. Thus, the sharp fall of ₦3.3 billion in oil revenue from ₦8.6 billion in 1982 to ₦5.3 billion in 1983 resulted in a budged deficit of about ₦4.9 billion, while that of 1982 was ₦3.7 billion. The mean annual percentage change in money supply was 9.7 per cent for 1983/85. The only factors that accounted for the increase are expansion in the bank credit to the government, increase in the net foreign assets, and other assets (net) of the banking system.

Following the moderate expansion of money supply since 1981, it was further dippened in 1986. It fell by about 1.2 per cent in the year.

The fall can be attributable to the fall of ₦6.6 billion in the 'other' assets (net) of the banking system and the ₦936.9 m accretion to quasi-money. The fall in other assets could be accounted for by the rapid build-up of the 'other' liabilities of the CBN following the call on authorised dealers in foreign exchange in August and October 1986, to transfer to the CBN naira lodgements in respect of foreign payment arrears which could not be effected because of foreign exchange shortage. Withdrawals from banks on this account amounted to ₦4.2 billion by the end of the year. In addition, the fall in the naira exchange rate led to the revaluation of the CBN's medium- and long-term liabilities, which bankers' deposits in their SFEM accounts with the CBN rose. The

contractionary impacts of these factors was, however, partly offset by the expansionary effect of the N4509 million increase in bank credit to the economy.

This moderate trend recorded in the past few years was intercepted in 1987 when the percentage increase rose to 13.6, 43.9 per cent in 1988, and 19.8 in 1989. These three years recorded a mean annual percentage increase of 25.8.

The main factors that were expansionary was the increase in the bank credit to the economy and the net accretion to foreign assets of the banking system. This expansion was slowed by the increase in quasi-money. The low rate of growth in 1989 as compared with the previous year was as a result of certain policy measures taken to tighten liquidity and to curtail inflationary pressures.

From the foregoing review of the trend of money supply in Nigeria, certain factors that affect the supply of money can be highlighted. Table 3.1 is an extraction by B.A. Oke and T.E. Nwade (1977) with which the effects of those factors on the money supply is established. Factors like the bank credit to the government and private sector, the changes in the foreign asset, change in quasi-money. The increase in these variables become manifest in affecting the money supply when they are monetised, that is, when the increase is spent.

TABLE 3.1: GOVERNMENT SPENDING AND MONEY SUPPLY

END OF YEAR	TOTAL FINANCIAL ASSET AT THE END OF YR. (1)	INCREASE IN BANK CREDIT IN THE YEAR (2)	NET FOREIGN EXCHANGE INFLOW (3)	1+2+3 EXPECTED LEVEL OF TOTAL FIN ASSET (4)	OBSERVED LEVEL OF TOTAL FIN ASSET (5)	ESTIMATED GOVERNMENT SPENDING WHICH AFFECTED MONEY SUP. (4)-(5)
1973	489.7	-31.3	196.9	655.3	568.2	87.1
1974	2,581.9	30.6	617.5	3,230.0	3,034.8	195.2
1975	2,321.3	241	521.6	3,083.9	2,377.5	706.4
1976	2,113	261	488	2,862	2,254	608

SOURCE: CBN, Economic and Financial Review, 1977 December. P.5

They made some estimates of monetisation or government spending which affect money supply. Distinction between government spending which can increase money supply and the one which can not is made.

In the first place, if revenue collected equals the government spending in any particular period, the spending has no impact on money supply and government financial assets will increase by the exact amount accruing from bank credit and net inflow of foreign assets on government account.

Secondly, when government spending is less than revenue from internal sources alone, the amount by which the spending falls short of the revenue will be reflected as a contraction in money supply (M_1) and as an increase in government financial assets - more than the increases from the bank credit and net foreign assets inflow on government account.

If government spends NX million more than internal revenues, only NX million will be expansionary on money supply, while government financial assets will rise by the amount of bank credit to government plus naira counterpart of foreign asset inflow on government less NX million.

Lastly, when the NX million (government deficit) exceeds the income from external sources plus bank credit, the closing balance of government financial assets will fall short of the opening balance by the amount of the excess spending above bank credit plus naira counterpart of government foreign asset inflow.

Oke and Nwade regressed data in Table 3.1 on a monthly basis which gives the following estimates:

(1) $M_1 = 3.86 + 0.166\ G$
(12.3164)

$R^2 = 0.9217$; F = 358.40; S.EE = 0.0135; d.f. = 52

(2) $M_2 = 13.47 + 0.2492\ G$
(13.0239)

$R^2 = 0.9423$; F = 386.61; S.EE = 0.0185; d.f. = 52

(3) $QM = 9.78 + 0.0838\ G$
(10.4639)

$R^2 = 0.8164$; F = 278.91; S.EE = 0.0080; d.f. = 52

where M_1 = currency outside bank plus demand deposit

G = government spending

M_2 = M_1 plus savings deposit

QM = quasi money

The result in (1) shows that there is a significant positive relationship between the government spending and the supply of money. The same applies to (2) and (3) which means that government spending significantly explains the direction of money supply.

With the available data on the factors that determine the money supply, a regression is carried out and here is the result.

$$Ms = 5.9796 + 0.7111\ NFA + 20.49\ P - 1413.7\ e + 0.254\ Cr$$
$$(651.33)\ (0.305)\quad (12.707)\ (420.43)\ (0.2655)$$

$R^2 = 0.98$, F = 168.67, DW = 0.79

About 98 per cent of the changes in money supply is accounted for by the equation. Only the exchange rate carried a wrong sign. The net financial asset, price level and the exchange rate are significant at about 3 per cent, 13 per cent, 0.4 per cent respectively. That shows that exchange rate is the most significant in the determination of the total money supply, and the negative sign it carries may be due to the short period it became so significant in the economy, after the devaluation. The net financial asset shows the variable that determine largely the volume of money supply.

On an international comparison, money supply in Nigeria has well outstripped those of all developed industrial countries as well as the less developed ones (Table 3.2). Comparing the annual rate of change with the OPEC countries, where the rate of growth had been generally high, the recent growth rate in Nigeria is disturbing. Among the countries for which figures are available, the Nigeria's increase in money (18.1%) was second lowest in 1973. In 1974, however, the Nigerian rate ranked the fourth highest at 42.5%, being lower than Iraq, Libya and Gabon with 43.3, 46.7 and 68.3% respectively. Following the trend, in 1975, the Nigerian rate of increase was second highest lower than the 80.9% by Saudi Arabia. Even with a fall to 61.1% in 1976, it was still higher than eight of the OPEC countries (Table 3.3).

TABLE 3.2: ANNUAL CHANGES IN MONEY SUPPLY IN SELECTED DEVELOPED AND LDCs (% AGE)

PERIOD	DC						LDCs							
	NIGERIA	USA	FRANCE	GERMANY	SWITZERLAND	UK	INDIA	SRI LANKA	GHANA	KENYA	SIERRA LEONE	SOMALIA	TANZANIA	UGANDA
1960	-	0.0	13.5	6.3	10.5	1.9	6.5	1.8	18.8	-	-	-	-	-
1961	0.8	3.0	15.9	15.1	4.6	3.7	4.4	6.3	5.7	-	-	37.8	-	-
1962	3.1	1.9	18.5	6.6	1.3	3.6	10.1	5.0	21.1	-	-	11.0	-	-
1963	7.6	3.8	4.4	7.5	7.4	0.9	13.7	12.0	7.3	-	-	17.4	-	-
1964	15.9	4.6	8.1	8.2	6.3	5.1	10.1	7.8	48.9	-	-	5.5	-	-
1965	3.9	4.4	9.3	7.6	4.1	7.3	9.7	5.9	-0.7	-	0.9	11.4	-	-
1966	8.8	2.7	7.6	1.7	3.6	4.4	9.1	-3.5	2.9	-	3.9	11.3	-	-
1967	-9.1	8.0	4.7	10.1	6.9	11.0	9.1	9.1	-2.8	5.9	-0.6	11.6	2.2	12.3
1968	4.7	5.7	9.0	8.4	13.0	6.9	5.6	5.8	7.4	15.3	21.7	12.3	25.7	18.1
1969	30.1	3.8	0.7	5.6	11.5	2.8	11.8	-1.6	12.4	19.4	14.6	3.9	30.0	8.8
1970	42.6	3.7	7.5	10.0	2.6	9.0	12.9	4.0	5.5	19.4	-7.1	-12.4	9.2	13.4
1971	3.4	6.2	11.9	12.8	17.7	15.3	13.0	9.2	5.0	24.8	14.4	-	21.1	3.3
1972	11.3	7.6	14.9	13.9	5.5	13.9	12.7	15.7	44.1	16.6	18.9	33.8	11.3	37.2
1973	18.1	7.3	9.8	0.7	-0.2	5.1	17.3	11.9	15.4	27.5	23.6	15.1	17.4	-
1974	42.5	2.8	15.2	12.2	-3.5	10.8	9.3	4.6	23.7	4.5	14.7	24.0	28.8	-
1975	73.5	5.4	12.7	14.0	4.4	18.6	33.6	4.9	44.6	12.9	9.9	31.4	23.2	-
1976	61.1	5.6	7.9	3.9	7.7	11.4	24.7	34.9	41.7	26.0	19.6	20.5	24.6	

SOURCE: Same as Table 3.1 P 6

TABLE 3.3: ANNUAL CHANGES IN MONEY SUPPLY IN SOME OPEC COUNTRIES (% AGE)

PERIOD	NIGERIA	ALGERIA	ECUADOR	GARBON	INDONESIA	IRAN	IRAQ	KUWAIT	LIBYA	SAUDI ARABIA	VENEZUALA
1960	-	-		-	-	-	-7.1	-	19.8	-	-
1961	0.8	-	-	13.8	-	-	2.4	-	17.4	5.2	3.1
1962	3.1	-	12.7	12.3	-	6.9	8.4	-	10.4	11.7	-2.1
1963	7.6	-	12.3	10.0	-	8.7	11.1	-	17.6	20.9	7.5
1964	15.9	-	12.0	9.0	-	12.0	0.0	-	33.0	5.0	14.0
1965	3.9	10.5	2.7	-	-	12.5	12.0	-9.5	48.9	8.9	11.4
1966	8.8	8.2	13.9	-	764.2	9.5	7.1	52.9	39.9	15.2	1.6
1967	-9.1	27.3	9.9	-	133.4	14.5	8.3	7.9	30.0	11.4	9.3
1968	4.7	31.8	18.5	-	118.4	14.4	7.7	-10.7	28.5	14.7	8.4
1969	30.1	18.2	13.3	-	58.1	1.9	15.4	-10.9	34.4	5.5	10.9
1970	42.6	4.3	24.5	-	34.7	11.4	5.8	7.6	19.4	3.4	5.4
1971	3.4	11.4	11.4	13.4	28.2	20.7	4.4	15.0	51.2	10.2	16.7
1972	11.3	29.3	21.7	26.3	47.8	38.4	14.4	29.5	13.3	42.6	19.9
1973	18.1	13.0	30.7	24.2	41.6	29.7	24.4	24.0	24.5	39.9	19.2
1974	42.5	23.8	36.6	68.3	40.4	37.2	43.3	13.1	46.7	41.4	37.7
1975	73.5	30.4	10.8	55.5	34.2	20.1	35.3	48.4	15.1	80.9	50.4
1976	61.1	29.6	31.1	-	25.6	45.8	20.7	35.6	31.3	na	17.6

na = not available

SOURCE: As in Table 3.1. P6

3.2 THE TREND OF INFLATION

There has been a moderation in the movements of the price level since the birth of Nigeria in the first decade. Inflation stood at a growth rate of 4.1 per cent in the first seven to eight years. It became noticeable in 1969 and became stronger in 1970 with 9.9 and 13.7 per cent respectively. The CPI which measures the price level is computed in Appendix IV. The CPI for both the lower and middle income groups was primarily a reflection of higher food prices. This increase was basically due to expanded demand above supply. There was a restriction on the importation of many consumer goods which was partly responsible for the rise in prices. The increase in rental cost of residential space was due to demand pressures. The inflation rate of growth increased up to 1971 with an average annual rate of increase of 13.2% for the period 1969/71.

The rise in the price level was attributable mainly to the upward movement in food prices, although large increases were also recorded in the prices of some of the non-food items, e.g. fuel and light, clothing, etc. The increase in food prices and others was mainly a reflection of increased demand pressures following the integration and consolidation of the war-ravaged areas. In addition, the relaxation of import controls, while it could expand supplies, could not be effective in influencing downwards the upward pressure on the manufactured goods. In addition to this is the excess demand created by the Adebo salary awards of 1970.

In an attempt to curb the widespread inflation, the price control decree of 1970 was promulgated. This decree established a board which was empowered to impose prices on a wide range of essential commodities, e.g. textiles, tinned meat and fish, etc. Though they were successful to some extent, a large proportion of these items could still not be easily controlled.

In order to appease the populace again, a Wages and Salaries Review Commission was set up by the Federal Government in July 1970. They were to review the existing wages and salaries at all levels in the public services, statutory corporations and state-owned companies and determine the areas in which salaries, wages and other remunerations in the private sector can be rationalised and harmonized with those in the public sector. As it could be expected that once the wages and salary reviews were announced, the prices of consumer items would have been raised by sellers in the market.

Inflation declined in 1972 to 3.1%. The rate of inflation in food items was 2.4%. Tobacco and colanut ranked second at 4.0% after fuel and light. The low rate of inflation in the year is traceable to a moderation in the increases in the prices of clothing, especially and of locally produced foodstuffs. This was further augmented by supply from external sources, which helped to balance off the demand for and supply of goods and services.

The price level rose up in 1973 at 5.4 and increased through to 1978. The mean annual inflation rate was 18.1%. Over these years, the clothing and food components of the price level have been very high. The main cause of the inflation at this period is the excess demand over supply. All efforts to supplement domestic production with imports were frustrated by the persistent port congestion. In addition was the growing money supply, the boost in the disposable income which emanated from the Udoji award. All these helped to skyrocket the price level to the highest peak since independence.

Later in the year, the rate of increase called for the attention of the government and the Anti-Inflation Task Force was set up with the following terms of reference: (i) examine the current inflationary tendencies in the economy and identify their causes, (ii) review the fiscal, monetary and other anti-inflationary measures being pursued and, (iii) to recommend, bearing in mind the economic and social objectives of the country, short- and long-term policies and measures that would effectively contain inflationary pressures in the economy. The Force came out with the recommendation that a price Intelligence Agency should replace the Price Control Board, to monitor the price movements, except for petroleum. They also recommended that only the National Supply Company should play the role of supplementing existing sources of commodity supply. The monopolistic and restrictive trade practices should be legislated against, and stop the practice

whereby the same firms are the producers, wholesalers and retailers of certain commodities.

By 1976, the rate had declined to 23.9% perhaps as a result of the effectiveness of certain anti-inflationary measures taken in the year. Certain essential goods were imported and distributed by the NNSC through the public institutions, government offices and cooperatives. The campaign for the Operation Feed the Nation (OFN) must have had an impact on the price of food items which dropped from 41.8% in 1975 to 22.0% in 1976. As at 1978, when the money supply dropped, the price level also dropped. Prices further dropped in 1979. This must have been caused by the wage and salary restraint, reduction in government expenditure and bank credit; which had a freezing impact on the aggregate demand. It further dropped in 1980 to about 9.9% which must have been due to the importation of goods and the slow pace of monetary expansion.

This trend changed in 1981 when the inflation rate jumped to 20.8%. This was reflected majorly in the price of food component that rose sharply.

As an anti-inflationary measure, government stopped the issue of import licenses to individuals for importation of rice. These licences were to be issued only to government agencies, considered to be competent to import and sell the commodity at controlled price. The government also decided to take steps to prevent the importation of stock fish under

monopolistic conditions as was the case in 1980. In a further effort to encourage the expansion of food production, the guaranteed minimum prices of our major staple food crops were increased for the 1981/82 farm season. The increases ranged from 4.6% for rice (milled) to 5.1% for wheat. That of beans was put up by 4.9%, maize by 5.0%, millet by 5% and rice paddy by 4.8%.

The rate dropped in 1982 again but picked up in 1983, which could be due to the general scarcity of consumer goods as a result of hoarding and the sharp increase in money supply. This rise is too evident in the food and household items; and the prices in the rural areas was higher than those of the urban centres because of bad weather conditions, bush fires, crop and livestock diseases. Increased reliance on the imported food items by the rural dwellers and scarcity of locally manufactured items which are urban based.

This trend of upward movement in the price level fell in 1985 again to as low as 5.5%. This could be explained by the improved domestic supply situation and the restraint on the expansion of aggregate demand especially in the areas of government spending and a moderate rate of monetary expansion. These were supplemented by the rise in domestic production of manufactured goods.

The rate of increase in inflation further declined in 1986 by 1.8% to 5.4% from 5.5% in 1985. This was largely accounted for by the increase in food production and the

reduction in personal income through the tight monetary and fiscal policies pursued in the year which were embedded in the structural adjustment package (see SAP policy objectives and measures). However, the dismantling of the price control measures and the sharp depreciation of the naira exchange rate helped to soar the prices of manufactured and imported items.

Inflation continued its upward move in 1987 through 1989. The mean yearly increase was about 29.5%. The major factors accountable for this are probably the money supply, shortage of foodstuffs, increase in the cost of production stimulated by the devaluation of the naira exchange rate and high rate of interest rate and being aggravated by the removal of subsidies on some agricultural and industrial inputs.

CHAPTER FOUR

EMPIRICAL RELATIONSHIP BETWEEN THE MONETARY FACTORS AND INFLATION

Due to the limitation of adequate data for the macro-model built in Chapter Two, we are restricted to the use of a reduced form expressed later in Chapter Two. Several experiment was performed to see how best the available data can explain the inflationary process in Nigeria under the period being reviewed. The measure of inflation that is used in this analysis is the percentage change in the composite consumer price index. Some of the results of the coefficient of the budget deficit should not be embarrassing, the reason being that the actual figure, that is, the negative result of the difference between the total expenditure and the total revenue is what is used. If the absolute figure had been used the coefficient should have been directly related to the price level. Therefore, the coefficient of the budget deficit is negative where it is supposed to be positive.

Before the results on the changes in the price level as the monetary variables change are displayed and analysed, let us briefly take a look at the factors as they determine the actual level of prices in the economy. Below is the regression of the price level on the monetary factors.

$$P = 72.6876 + 0.025\ Ms - 0.0006\ Y + 4.4267\ e$$
$$(70.121)\quad (0.0068)\quad (0.0007)\quad (16.953)$$
$$- 1.248\ Pf + 0.776\ P_{t-1} - 0.0051\ BD - 0.01\ M_{s-1} \quad \ldots \quad (4.1)$$

$R^2 = 0.99$, $F = 213.56$, $DW = 2.35$.

The overall fit shows a very high relationship between the price level and the explanatory variables. It shows that about 99 per cent of the variations in the price level is explained by the variations in the independent variables. That tends to support the monetarist position of price determination. That controlling the monetary variables will bring under control the price level. Hence, if the variables included in the equation can be varied to about 99 per cent, the price level can be brought under control to the level of that percentage. However, the coefficients of the money supply and the price level in the previous year are the only variables which are highly significant at 0.2 per cent level. Only the coefficient of the foreign price and the lagged money supply carry wrong signs. The income carries a correct sign, since an economy operating at equilibrium below full-employment level of output with an increase in the output level will exert a deflationary pressure on the price level. However, it is not significant in explaining the price level. The budget deficit and the exchange rate carry correct signs; but they are not significant in this equation. The reason for the insignificance of the exchange rate coefficient is majorly because it came into scene at the latter part of the period covered under study. Hence, the other years and variables have swallowed the impact of it on the price level. When the above result is compared with that of London (1989), where he included in his result exchange rate, he had:-

$$P_t = \underset{(4.85)}{0.83} + \underset{(0.21)}{0.99}\ M_t - \underset{(0.69)}{1.74}\ Y_t + \underset{(0.98)}{2.17}(P_{t-1} - P_{t-2}) + \underset{(0.04)}{0.05}\ e_t$$

$R^2 = 0.85$, $F = 32.62$

The coefficient of exchange rate in this result significantly affect the price level. The reason could perhaps be due to the fact that he lumped together many countries and their exchange rate may on the whole be significant. When the result is compared with the work of Ojameruaye (1974), where he included exchange rate as a determinant of price level, he had:

$$CPI = 130.902 + \underset{(2.174)}{237.41}\ ER - \underset{(2.431)}{0.016}\ FER - \underset{(0.649)}{0.805}\ IMR + \underset{(12.371)}{0.236}\ IM - 552.29\ IOE$$

$R^2 = 0.99$, $F = 423.055$, $DW = 1.65$

According to him, the exchange rate carried a wrong sign which left its coefficient without explanation.

Splitting the data into two and regressing the price level on the same variable as done in (4.1) for the period 1969-1980

$$P = \underset{(34.927)}{15.286} + \underset{(0.0015)}{0.0054}\ Ms + \underset{(0.0015)}{0.00197}\ Y - \underset{(34.891)}{52.54}\ e + \underset{(0.2859)}{1.34}\ Pf - \underset{(0.1409)}{0.152}\ P_{t-1} - \underset{(0.00038)}{0.004}\ BD + \underset{(0.0027)}{0.015}\ M_{s-1} \quad \ldots \quad (4.2)$$

$R^2 = 0.99$, $F = 2630.69$, $DW = 2.78$

The percentage of the variations in the price level that is explained by the variations in the explanatory variables is about 99. The goodness of fit is depicted by the F-statistic, which is very high. The coefficients of money supply and its lag are rightly signed and highly significant in explaining the price level, at 2 per cent and 0.1 per cent levels respectively.

This is majorly due to the monetisation of the foreign exchange receipts from the sale of crude oil that led to increase in the money supply. This was also accounted for by the payment of awards like the Adebo and Udoji awards of 1972 and 1974/75 respectively, which skyrocketed the aggregate demand over and above the supply level. In addition to these is the increase in the bank credit to the government at the latter part of the 1970s which, working through the total money supply, fuelled the price level. Most of the credit to the government is to help finance the budget deficit that resulted, which ended up fuelling the inflation rate. The exchange rate shows a negative sign to show that in the 1970s, the exchange rate was relatively fixed and an increase in the price level will be inversely related. When this result is compared with that of 1981 to 1989, as displayed below; we shall see what happens.

$$P = \underset{(761.484)}{-957.65} + \underset{(0.01369)}{0.0314\ Ms} - \underset{(0.00125)}{0.00076\ Y} + \underset{(29.523)}{6.552\ e} + \underset{(6.4439)}{9.441\ Pf}$$

$$+ 0.066\ BD - 0.019\ M_{s-1} \qquad \ldots\ldots \qquad (4.3)$$

$R^2 = 0.98$, F - 28.63, DW = 2.47

The result still shows a very good fit with the R^2 = 0.98. That means that about 98 per cent of the variations in the price level in the 1980s were explained by the explanatory variables. The coefficient of money supply though positive is only significant at 15 per cent level; while that of the lagged money supply is inversely related and will be insignificant in explaining the price level. That is only to show that money supply in the 1980s is not a major determinant of the price level, even though it contributes, it is very insignificant. The coefficient of the exchange rate now shows a positive relationship with the price level. This positive relationship is engendered by the devaluation that took place at the last half of the 1980s when the naira exchange rate fell precipitously. The coefficient of the budget deficit is wrongly signed and insignificant.

Regressing the price level on some combinations of the explanatory variables like Ms, Y and BD we obtain the following results:

$$P = \underset{(15.451)}{19.796} + \underset{(0.0022)}{0.029}\ Ms + \underset{(0.0006)}{0.0009}\ Y - \underset{(0.0017)}{0.003}\ BD \quad \ldots \quad (4.4)$$

$R^2 = 0.97$, $F = 181.52$, $DW = 0.80$

The result shows a good fit between the explanatory variables and the price level. About 97 per cent of the variations in P is explained by the variations in the independent variables. The coefficient of Ms is highly significant in explaining the variations in P. The coefficient of income carries a wrong sign and only significant at about 12 per cent level. The coefficient of

the budget deficit has the correct sign expected and significant at about 7 per cent level. This result shows that when some of the variables are eliminated, the others tend to show prominently.

Regressing the price level on the exchange rate and the lagged value of money supply, we have:

$$P = \underset{(16.737)}{23.403} + \underset{(9.398)}{35.41}\, e + \underset{(0.003)}{0.029}\, M_{s-1} \qquad \ldots\ldots \qquad (4.5)$$

$R^2 = 0.96$, $F = 215.91$, $DW = 1.83$

The coefficient of determination is very high implying that about 96 per cent of the variations in P is explained by the regressors. The coefficients of exchange rate and lagged money supply show positive relationship with the price level and are significant at 0.1 and 0.0 per cent levels. This tells us that when the exchange rate is considered along with the lagged value of the money supply, they are both significant in explaining the price level.

On the other hand, when P is regressed on the lagged value of itself and that of money supply, we have

$$P = \underset{(14.377)}{9.554} + \underset{(0.1956)}{0.997}\, P_{t-1} + \underset{(0.0067)}{0.0045}\, M_{s-1} \qquad \ldots\ldots \qquad (4.6)$$

$R^2 = 0.97$, $F = 298.26$, $DW = 2.4$

The variations in the lagged values of P and Ms explains about 97 per cent in the current price level. The explanatory variables show correct signs but only the past price level is significant in explaining the current price level. The lagged

value of Ms which is not significant shows us the slow response of changes in price level to the changes in money supply. It is unlike the monetarists who assert that the adjustment mechanism is instantaneous, especially in the long-run. But their long-run is not defined.

Considering the impact of exchange rate on the price level, we have regressed P on e:

$$P = \underset{(34.81)}{110.14} + \underset{(14.365)}{107.42}\, e \qquad \ldots\ldots \qquad (4.7)$$

$R^2 = 0.75$, $F = 55.92$, $DW = 0.40$

With a high R^2 of 75 per cent, the coefficient of e shows a positive relationship with P and it is highly significant at about 0.0 per cent level. Again, regressing P on Ms, we have:

$$P = \underset{(16.797)}{14.091} + \underset{(0.0016)}{0.033}\, Ms \qquad \ldots\ldots \qquad (4.8)$$

$R^2 = 0.96$, $F = 425.32$, $DW = 0.56$

The coefficient of determination shows that about 96 per cent of the variation in P is explained by that variation in Ms. That shows that money supply is a major determinant of the price level. It is highly significant at about 0.0 per cent level.

The result above compares well with that obtained by Oyejide (1972), Ojameruaye (1974) and Falegan (1974), with their results shown below respectively.

$$P = 78.7018 + \underset{(9.9602)}{0.3143}\, M$$

$R^2 = 0.9821$, DW = 0.7917

$$CPI = 108.2527 + \underset{(30.457)}{0.1592\ Ms}$$

$R^2 = 0.98$, F = 927.609, DW = 1.127

$$P_t = 45.0991 + \underset{(17.4737)}{0.1930\ M_t}$$

$R^2 = 0.7666$, F = 49.2713, DW = 0.9867

In all their results, Ms was found to be very significant in the explanation of the price level.

Regressing the price level on the government expenditure, we have:

$$P = \underset{(26.981)}{60.50} + \underset{(0.0021)}{0.244\ GE} \qquad \ldots\ldots\ldots \qquad (4.9)$$

$R^2 = 0.87$, F = 128.18, DW = 1.48

The high R^2 shows us why and how the government expenditure has been on the increase without a concomittant increase in the revenue and that is why it has always resulted to borrowing to finance the budget deficit. The coefficient of GE shows that it is highly significant at 0.0 per cent level or that GE is highly significant in explaining price level.

So far, we have been able to show how significant the monetary variables are in explaining the price level. But that is not our destination yet. The focus is to investigate into the nature and impacts of the changes in the explanatory

variables on inflation. Thus, the percentage change in the CPI will be regressed on the percentage change in the independent variables.

Regressing I on the changes in the reduced form equation, we have:

$$I = \underset{(4.9443)}{5.3797} + \underset{(0.1389)}{0.25}\ Ms + \underset{(0.0484)}{0.007}\ e - \underset{(0.0093)}{0.011}\ Y - \underset{(0.0033)}{0.006}\ BD$$

$$+ \underset{(0.1453)}{0.34}\ M_{s-1} - \underset{(0.0031)}{0.007}\ BD_{-1} \quad \ldots\ldots \quad (4.10)$$

$R^2 = 0.44$, $F = 1.80$, $DW = 1.51$

The variation in inflation is not well explained by the variations in the monetary factors. The regression equation only explains about 44 per cent of the total variations in the inflation rate in Nigeria. A brief comparison of this result with that in model (4.1) shows that changes in the explanatory variables do not account for changes in the price level as much. The F-statistic shows a poor fit. All the variables show correct signs. The coefficient of Ms is significant only at about 10 per cent level, while that of M_{s-1} is significant at about 5 per cent level. The budget deficit lagged is significant at about 4 per cent while the current budget deficit is significant at about 7 per cent. The coefficient of exchange rate shows that it is not significant in explaining inflation rate in Nigeria for the period under consideration. A possible explanation to this is because the time when the changes in the exchange rate became significant in Nigeria is so short under the period being reviewed, so the impact of it must have been swallowed up in the other variables.

Looking at the impact of the money supply changes and its lag on the inflation rate, we have:

$$I = \underset{(4.2497)}{11.263} + \underset{(0.1313)}{0.107}\ Ms + \underset{(0.1312)}{0.144}\ M_{s-1} \qquad \ldots\ldots \qquad (4.11)$$

$R^2 = 0.15$, $F = 1.64$, $DW = 1.26$

The total variations in the inflation rate that is explained by the changes in the money supply and its lag is only about 15 per cent. Even though the coefficients satisfy the 'a priori' expectation, the coefficients are not significant in the explanation of inflation. M_s and M_{s-1} are significant only at 42 per cent and 30 per cent levels respectively. We can, therefore, affirm that the impact of the changes in the money supply on the inflation rate is very minima.

Adding the budget deficit and its lag together with exchange rate, we have:

$$I = \underset{(5.0964)}{6.0899} + \underset{(0.1397)}{0.225}\ Ms + \underset{(0.05011)}{0.327}\ M_{s-1} - \underset{(0.00334)}{0.0059}\ BD - \underset{(0.1497)}{0.0066}\ BD_{-1} + \underset{(0.0032)}{0.0059}\ e \qquad \ldots\ldots\ldots \qquad (4.12)$$

$R^2 = 0.39$, $F = 1.81$, $DW = 1.35$

In this regression, only about 39 per cent of the variation in inflation is explained by the explanatory variables. The money supply and its lag bear correct signs and their level of significance has improved to 13 per cent and 5 per cent levels respectively. The budget deficit and

its lagged value have expected signs and signigicant at 10 per cent and 5 per cent levels respectively. The change in the exchange rate, though exhibit a correct sign, is not significant in the regression.

Considering the M_s, M_{s-1} and e, we have:

$$I = \underset{(4.9798)}{11.455} + \underset{(0.1435)}{0.109}\ Ms + \underset{(0.1392)}{0.143}\ M_{s-1} - \underset{(0.055)}{0.0006}\ e \quad \ldots (4.13)$$

$R^2 = 0.16$, $F = 0.99$, $DW = 1.27$

which is the regression (4.11) together with the change in the exchange rate on inflation. Only about 16 per cent of the variations in inflation is accounted for by the regression equation. It improved the coefficient of determination of (4.11) by 0.01, by the presence of the exchange rate. None of the coefficients is significant at any reasonable level. That implies that the combination of these variables are not signigicant in explaining the changes in the price level.

Regressing the lagged BD and M_s together with e, we have:

$$I = \underset{(3.8099)}{11.759} - \underset{(0.0027)}{6.59}\ BD_{-1} + \underset{(0.0004)}{0.001}\ M_{s-1} - \underset{(0.0539)}{0.084}\ e \quad \ldots \quad (4.14)$$

$R^2 = 0.26$, $F = 1.97$, $DW = 1.95$

Only about 26 per cent of the variations in inflation is explained by the equation. The fit is not too good as indicated by the F-statistic. The coefficients of BD_{-1} and M_{s-1} are rightly signed but only the M_{s1} is significant at about 3 per cent level in explaining changes in P.

When the impact of money supply lagged and exchange rate lagged are considered on inflation, it gives us:

$$I = \underset{(3.6355)}{12.061} + \underset{(0.00044)}{0.0009\ M_{s-1}} - \underset{(0.0527)}{0.06\ e_{-1}} \qquad \ldots\ldots \qquad (4.15)$$

$R^2 = 0.20,\ F = 2.32,\ DW = 1.54$

About 20 per cent of the variations in inflation rate is accounted for by the variations in the independent variables. One of the reasons why the exchange rate is carrying a negative sign is simply that when the exchange rate became significant in explaining the price changes under the period being reviewed, can not be more than two to three years. And the years are so small when compared with the period covered in this study. The money supply lagged is significant at 5 per cent level while that of e_{-1} is significant at about 30 per cent level.

Some of the components of the CPI were also regressed on some of the explanatory variables, and below are some of their results:

$$F_p = \underset{(16.1098)}{10.924} + \underset{(15.485)}{29.37\ e} - \underset{(0.00095)}{0.0003\ Y} + \underset{(0.00258)}{0.029\ M_s} \quad \ldots. \quad (4.16)$$

$R^2 = 0.97,\ F = 187.26,\ DW = 1.14$

$$I_F = \underset{(6.054)}{10.301} + \underset{(0.2128)}{0.383\ M_s} - \underset{(0.00473)}{0.005\ BD} - \underset{(0.0046)}{0.004\ BD_{-1}} \quad \ldots \quad (4.17)$$

$R^2 = 0.17,\ F = 1.10,\ DW = 1.15$

$$P_T = \underset{(13.228)}{-120.798} + \underset{(2.978)}{39.97\ e} + \underset{(0.1609)}{3.076\ P_f} \qquad \ldots\ldots \qquad (4.18)$$

$$R^2 = 0.98,\ F = 731.46,\ DW = 1.18$$

$$I_T = \underset{(3.5258)}{12.479} + \underset{(0.00030)}{0.0005\ M_{s-1}} + \underset{(0.0985)}{0.15\ M_{s-1}} + \underset{(0.0022)}{0.003\ BD}$$

$$+ \underset{(0.00213)}{0.005\ BD_{-1}} \qquad \ldots\ldots\ldots \qquad (4.19)$$

$$R^2 = 0.31,\ F = 1.70,\ DW = 1.65$$

$$I_{T\&K} = \underset{(5.1162)}{4.9385} + \underset{(0.00044)}{0.001\ M_{s-1}} - \underset{(0.1431)}{0.109\ M_{s-1}} + \underset{(0.0032)}{0.002\ BD}$$

$$+ \underset{(0.0031)}{0.005\ BD_{-1}} \qquad \ldots\ldots \qquad (4.20)$$

$$R^2 = 0.68,\ F = 7.99,\ DW = 0.85$$

$$I_{F\&L} = \underset{(5.1379)}{5.342} + \underset{(0.1455)}{0.155\ M} + \underset{(0.0592)}{0.133\ e} - \underset{(0.0608)}{0.04\ e_{-1}} \quad \ldots \quad (4.21)$$

$$R^2 = 0.25,\ F = 1.78,\ DW = 2.19$$

The equation (4.16) above regresses price of food on the exchange rate, income and money supply. About 97 per cent of the variations in the prices of foodstuffs in the country is accounted for by the explanatory variables. The coefficient of exchange rate is rightly signed and significant at about 8 per cent level, while that of the money supply is also positive and highly significant at about 0.0 per cent level. The coefficient of income is not significant at all.

Expression (4.18) shows the regression of inflation in the food sector on the changes in money supply, budget deficit and its lag. The explanation of the changes in prices by the variables is quite poor. However, only money supply is significant in the variations of food prices at about 10 per cent level.

Regression (4.19) shows the relationship between the prices in the transport sector and exchange rate and foreign price. The variables explain about 98 per cent of the variations in the prices in the transport sector. The exchange rate variables is especially of interest here since the inception of SAP and SFEM and the ban on certain spare parts of vehicles. The exchange rate had led to very high rate of cost of production of the vehicles within the home economy and this spills over to be high prices of sales of vehicles and even that of the transport fares of the commercial vehicles. Both the exchange rate and the foreign price are highly significant in explaining the price level at about 0.0 per cent level. Considering the equation (4.19), which shows the relationship between inflation in the transport sector and the money supply and budget deficit, we discover that they only account for about 31 per cent of the variations in the changes in the price level in the transport sector. The money supply lagged is significant at about 16 per cent level, while that of change in money supply lagged is significant at 15 per cent level. The change in budget deficit and its lag are significant at 16 per cent and 3 per cent levels respectively. That implies that only the lagged budget deficit is the most significant in effecting a change in inflation in the transport sector. Equation (4.20) shows the inflation in Tobacco and Kolanut as money supply and budget deficit change. About 68 per cent of the variations in the price is explained by the regression equation. Only M_{s-1}

and BD_{-1} are significant at 1 per cent and 0.0 per cent levels respectively. Equation (4.21) indicates the relationship that exists between inflation in the fuel and light sector and the money supply and exchange rate. Only 25 per cent of the changes in the prices of fuel and light that is explained by the regression equation. Only exchange rate is significant at a reasonable level of 3 per cent. This reason simply being that when the exchange rate fell in 1986 upward, it led to massive budget deficit that made the government to remove the subsidies on petroleum and its products, thereby pushing up the price per litre and electricity bills both for the domestic and industrial consumption. The increase in the electricity bills in the industrial sector adds more to the cost of production which is again shifted to the consumer in form of a general rise in price.

4.1 EVALUATION OF THE ESTIMATED MODEL

The empirical relationships between the various monetary factors and inflation have brought us to a point in this analysis. The coefficients of most of the variables have satisfied the 'a priori' expectation, especially money supply, lagged money supply, budget deficit, the exchange rate. Looking at the coefficient of the national income from a different angle, we would conclude that it carried the right signs on most occasion. When an economy operates at

equilibrium that is less than full-employment, an increase in the output level has a deflationary effect on the price level. In that case, it is not a contradiction of expectation to have an inverse relationship between the output level and the price level. Furthermore, when the real output is considered, it has a dampening effect on the price level (Ajayi and Teriba, 1974). Among all these explanatory variables, only money supply and exchange rate significantly explain the price level, when they are regressed together and separately. Another variable that significantly determine the price level is the increase in government expenditure. This explains why the budget deficit is always directly related to the price level, since the total expenditure is always larger than the total revenue. The insignificance of the money supply in other equations is because of the slow response of the price level to the changes in the money supply. That seems to negate the monetarist view that there is always instantaneous adjustment of the price level to money supply.

Noteworthy is the nature and degree of relationships that exist between these same factors and the inflation rate. Even though they determine the actual price level in the economy, they play very little role in the inflationary process in the country. It can be recalled that in equation (4.13), only the changes in the money supply lagged that is significant at a reasonable level in explaining the changes in the price level.

The next test is the hypothesis of the proportionality between the money supply and price level and inflation. The

tests have been conducted at 1 per cent and 5 per cent levels, and they indicate non-proportionality between changes in money supply and price level. That implies that, though they are directly related, there is no 100 per cent transmission of the money supply into the price level.

4.2 THE VALIDITY OF THE ASSUMPTIONS OF CONSTANT VELOCITY AND FULL-EMPLOYMENT LEVEL

The pillar on which the monetarist view of "inflation is every where and every time a monetary phenomenon" is anchored in the validity of the specified assumptions of constant velocity of money and that the economy is at full-employment level of output. From the equation of exchange discussed in Chater Two,

$$PQ = MV.$$

The only conditions for changes in money supply to transmit into price level are (i) when the assumptions hold; (ii) when the change in V is greater than that of Q. That is, if $V > Q$, which then implies that $P > M$ for the equation to still hold. If V is increasing at a slower rate than that of Q, it means that an increase in M may not be the causal factor for an increase in P. It is found in Appendix 6, that the assumption of V does not hold. Over the years, V has been falling in the Nigerian economy. It may be erroneous, therefore, to say that V is constant in Nigeria. On the other hand, the change in V is much slower than that of Q, and so,

changes in M may not be the principal causal factor for the changes in P.

The data on the GDP in the Appendix has not in any way pointed to the fact that the Nigerian economy is in any way near full-employment level of output. Apart from the output level as an indicator, the evidence in the real life of the rivers of the labour force jobless is a good indicator that we have not approached the full-employment level. If the changes in the output level is so small that it will deceive anybody to think that the economy is at full employment, it will be wrong. The slow response of the output level to the policy measures may be due to the inherent structural rigidities, which are quite difficult to quantify, if not impossible. These evidences have invalidated the assumptions of the quantity theorists.

CHAPTER FIVE

SUMMARY AND CONCLUSION

This thesis had attempted to find out the nature and the strength of relationships that do exist between the monetary factors and inflation in Nigeria. Attempts have also been made to see whether the previous year's magnitude of the various factors are also significant in explaining the inflationary process in Nigeria today. We have also demonstrated the inflationary trend as it is affected by the factors in the boom period (1969-80) and recession period (1981-89). Having established the nature of the relationship that does exist between inflation and the variables, we also saw that between price level, inflation and the money supply, and we discovered that it is direct and very strong. We saw that between the price level, inflation and exchange rate. We found out that the relationship between the variables and price level were quite high while that between them and inflation was lower, implying that the changes in the explanatory variables are not too significant in explaining the inflation rate, even though they are good determinants of the price level.

Of interest is the behaviour of price level during boom and recession era. Money supply and its lag were quite significant in explaining the price level in the boom era. But in the 1980s, the level of significance fell sharply. That is to tell us that inflation in the 1980s is not majorly

caused by the money stock. Among the other factors are budget deficit and exchange rate which became so prominent, though they are not too significant in explaining the inflationary trend at that period. As explained in Chapter Three, quite a number of stringent measures were embarked upon, among which were monetary policy measures, in order to curtail the expansion of money supply, in spite of these, prices were still going up. In that case, it will be erroneous to attribute the changes in the price level to changes in the money supply.

We have also shown that the exchange rate and the budget deficit are important price determinants, but they are not too significant in the explanation of the inflationary process in Nigeria. Demonstrated also is the fact that the economy is not at full employment nor is the velocity of money constant.

The policy implications of the result are that the emphasis or campaign by the monetarist on the relative effectiveness of the monetary policy over the fiscal policy in controlling the economic activities may not be the best policy in the Nigerian economy. The moderation of the money supply to control the price level may not be much effective. In as much as there is a high level of relationship between the money supply and the price level in the '70s, it then becomes a problem in explaining the rising prices in the face of the stringent economic and monetary measures of the 1980s. It became evident in the result that a change in the money supply in period t may not have an effect on the price level until

period t + 1, and so, it may be unjustifiable for policy-makers who intend to control the price level aiming so strictly and strongly on the changes in the money supply simply because it seems to transmit faster into effecting a change than the fiscal policy does. It then means that the money supply as a measure of curbing inflation could only marginally reduce inflation. It will, therefore, be necessary to make a further research into the other factors that seem to affect inflation to see which of the factor or factors have the greatest impact on inflation.

In view of the above, the following are the policy prescriptions. It has been found that the factors that seem to affect the supply of money include the credit allocations in the economy, the government expenditure, especially the deficit financing, it then behoves the government to cut down their coat according to their cloth. The little impact that money supply has on the price level would have been eliminated had the government known how to moderate their spending.

It was clear in the work that the relationship between the price level and the real output is inverse, hence, for an effective control of inflation, the real output will have to be increased. Instead of the government spending heavily in the unproductive sectors that are in themselves inflationary, the resources should be channelled to the production of goods and services.

The traditional tools which operate on demand management to curb inflation through interest rate, tight monetary policy and price control have been seen to be ineffective in Nigeria. The reason being that the economy does not respond readily to these policy instruments because of structural deficiencies or rigidities and inelasticities. The financial institutions are yet to be fully developed so as to permeate every sector of the economy in affecting the price level. Even in cases where there is fairly high level of financial operations, the people may not be willing to utilise them. In that case, any policy that is to be effected through these institutions may not be realised.

Experiences have shown that the idea of price control has been self-defeating, especially in an economy where imports constitute a relatively high proportion of aggregate supply or where smuggling and high rate of hoarding are in full operation. When the available goods are hoarded because of price control, it leads to scarcity which eventually result in black marketing and again inflationary.

Now that it has been revealed that the major organs of financial operations are relatively weak in the Nigerian economy, it then means that it may be more of uncertainty to ascribe the increase in the price level to the variations in the monetary variables. The inflationary trend in the Nigerian economy is bedevilled by a lot of factors which the policy-makers and analysts will have to research into in order to correctly identify the main cause(s) of inflation in

Nigeria. It had been obtained from research and experience that the most dominant factor fuelling inflation in Nigeria is inflationary expectation (Habeeb, 1985). This seems to be the most crucial factor that the policy-makers have to address. Whenever increases is expected, the confidence of people in the currency begins to decline - this also leads to uncertainty. It is a usual observation in Nigeria that as a result of price expectation, whenever there is any announcement of policy goal, the economic and social groups will quickly attempt to integrate such policy into their decision. This is in order to improve their position relative to other groups. An example is a situation where the government decides to increase the rate of interests on borrowings, the producers and sellers will immediately raise their prices. Even though the policy may be anti-inflationary, but because of price expectation, prices have increased even before the implementation of the policy which is aimed at reducing the money supply. Hence, it may never work if the government wants to control inflation by a policy that can help mop up the money in circulation if the same strategy of implementing or of passing it across to the public remains the same. If this type of policy is to be productive, the government would have to implement the policy without announcing it until it is done and result achieved.

It is also a usual phenomenon for government to set a target of monetary expansion and shooting beyond that. If the monetary policy is to go any length in affecting the price

level, the policy managers and the government will have to be disciplined not to dance to any tune be it internal or external that seems to contradict their goals. When this type of side-tracking is eliminated, the structural rigidities will gradually wane off.

The inflationary trend in the 1970s that seems to be highly related to the increase in money supply was majorly caused by the monetisation of the oil receipts. Workers received the different awards that were granted at the expense of the productive sector. The ability of the public to demand was increased without a corresponding increase in output level. If Nigeria happens to find herself in that type of economic boom in future, it will be wise to conserve the revenue and pump them into productive ventures, instead of making the public glad which will later turn around to be eroded by increase in the price levels bringing them to square one.

Doubtless to say is the impact of the budget deficit on the bank credit to the government and through to the price level. It is adviceable that the government cut their coat according to their materials. It is actually unreasonable spending beyond what is earned as revenue. If the government can not moderate their spending, they will never be able to bring inflation under control.

Obviously, the inflationary pressure that is being experienced today in Nigeria is mostly as a result of the depreciated naira which had doubled the import bills and

transmit through cost of production to the high prices. Theoretically, an economy that has a low elasticity of supply for export and a low elasticity of demand for import is the one that will bear the adverse effect of a devaluation. Nigeria's supply response is slow because of the aggrarian nature and the response to import is also slow because we depend so heavily on the imported inputs and, even for food. Hence, any devaluation raises the naira value of the imported items which is transmitted through the production process to increases in price. Unless the government gets something done to the value of the naira, either by fixing the exchange rate again, the goods whose inputs are foreign will never stop rising in prices and even propelling others to rise, especially since Nigerians ascribe quality to prices.

The control of these lapses and laxities on the part of the government and policy formulators and executioners will help to buttress the little effectiveness of the financial sector in controlling the monetary variables, so as to minimise their effects on the price level. As it is on the ground, the monetary factors have been found to be good determinants of the price level, but they play little role in the inflationary pressures that have nearly crippled the economic activities in the country. It will be appropriate, then, to properly address the money supply, exchange rate, budget deficit, price expectations and the structural rigidities that tend to cripple any policy put in place in Nigeria if the problem of inflation is to be properly and thoroughly contained.

APPENDIX I

DERIVATION OF THE EQUILIBRIUM PRICE AND OUTPUT LEVELS

The general equilibrium level of output, prices and employment is obtained by the interplay of the goods market, the labour market and the money market. Let us first derive the equilibrium in the labour market:

On the basis of the assumption that individual firms will attempt to maximize their profits, it is implied that the demand for labour will be equal to the value of its marginal product and wage rate or the real wage rate (the money wage rate, W, divided by the price level, P) equals the marginal physical product of labour. We shall use a linearly homogeneous Cobb-Douglas production function:

$$Q = K^b L^c \; ; \; 0 < b, c < 1 \qquad \ldots\ldots \qquad (i)$$

$$W/P = \; Q/\; L \; = \; c(K/L)^b$$

Solving for L = ld

$$Ld = \underset{\text{Demand for labour}}{c^{1/b} K(W/P)^{-1/b}} \qquad \ldots\ldots\ldots \qquad (ii)$$

(i) Derivation of the aggregate supply function from the supply of labour that is a function of Real Wage Rate:

$$\text{Given Ls} = \underset{\substack{\text{labour supply dependent on the} \\ \text{real wage}}}{lw/p(W/P) \; ..} \qquad \ldots\ldots \qquad (iii)$$

At the equilibrium of employment, there must exist a W/P where Ld = Ls; which is obtainable by solving (ii) and (iii) simultaneously, we have:

$$Le = \underset{\text{equilibrium employment.}}{(cK^b \; lw/p)^{1/(1+b)}} \qquad \ldots\ldots \qquad (iv)$$

Given (i), and substituting (iv) into (i), the equilibrium level of output:

$$Qe = K^{2b/(1+b)}[Clw/p]^{(1-b)/(1+b)} \qquad \ldots\ldots \qquad (v)$$

(ii) Derivation of the aggregate supply function from a labour supply function that is a function of money-wage rate (presence of money illusion):

$$Ls = lw \; W \qquad \ldots\ldots\ldots \qquad (vi)$$

There will again be a wage rate W, where Ld = Ls, hence, solving (vi) and (ii) simultaneously, we have:

$$Le = [cK^{b}\ lwP]^{1/(1+b)} \quad \ldots\ldots \quad (vii)$$

Substituting (vii) into (i), we have equilibrium level of output:

$$Qe = K^{2b/(1+b)}[cPlw]^{(1-b)/(1+b)} \quad \ldots\ldots \quad (viii)$$

Solving (viii) for P gives the equilibrium price level:

$$Pe = [lw\ cK^{2b/c}]^{-1}Q^{(1+b)/c} \quad \ldots\ldots \quad (ix)$$

(iii) Derivation of the aggregate supply function from a fixed wage rate (rigid) generating unemployment. In a situation of rigid wage rate, Wo, labour supplied will be higher than the demand, and hence, unemployment is created. In that case, labour demanded will be the amount employed, Le = Ld. Substituting Wo into (ii) and then plugging it into (i):

$$Le = K[cWo^{-1}P]^{1/b} \quad \ldots\ldots \quad (x)$$

$$Qe = K^{b}\ Le^{c} = K^{b}Le^{1-b} \quad \ldots\ldots \quad (xi)$$

$$Qe = K[c\ Wo^{-1}P]^{(1-b)/b} \quad \ldots\ldots \quad (xii)$$

Again, solving (xii) for P gives:

$$Pe = Wo[c\ K^{b/c}]^{-1}\ Q^{b/c} \quad \ldots\ldots \quad (xiii)$$

Consider the set of models in the goods market and solve for the aggregate demand.

$$Y = C + I + G \quad \ldots\ldots \quad (xiv)$$
$$C = Co + cy\ (Y - T) \quad \ldots\ldots \quad (xv)$$
$$T = tyY - to \quad \ldots\ldots \quad (xvi)$$
$$I = io - ir \quad \ldots\ldots \quad (xvii)$$
$$S+T = I + G \quad \ldots\ldots \quad (xviii)$$

Solving (xiv) to (xviii) simultaneously for Y and r gives:

$$Y = \frac{Co + io + cy\ to - ir + G}{1 - cy + cy\ ty} \quad \ldots\ldots \quad (xix)\ IS$$

Given models of money supply, money demand in the money market as:

$$M_t = my\ Y \quad \ldots\ldots \quad (xx)\ \text{(transactionary demand for money)}$$

$$M_s = mo - mr \quad \ldots\ldots \quad (xxi)\ \text{(speculative)}$$

$$M = M_t + M_s \text{ (total money demand)} \quad .... \quad (xxii)$$

Solving for Y and r in (xx) to (xxii)

$$Y = \frac{M - mo + mr}{my} \quad ..... \quad (xxiii) \quad LM$$

Solving IS and LM functions simultaneously, for Y gives

$$Y = \frac{mr[Co + io + cy\ to + G] + ir(M - mo)}{mr(1 - cy + cy\ ty) + my\ ir} \quad ... \quad (xxiv)$$

Equation (xxiv) is the aggregate demand in the economy.

Given the condition that the supply of labour depends on the W/P, the only variables that are not yet determined are the price level and the money-wage rate. Solving (iii) and (iv) simultaneously, we have:

$$W/P = (cK^b\ e^{-b}{}_{w/p})^{1/(1+b)} \quad ..... \quad (xxv)$$

Since the models of real wage rate determination does not determine the price level, we reconsider the aggregate demand.

$$\text{If } Y = PQ \quad ..... \quad (xxvi)$$

$$\Rightarrow \quad P = YQ^{-1} \quad ..... \quad (xxvii)$$

Substituting (v) and (xxiv) into (xxvii)

$$P_e = \frac{mr[Co + io + cy\ to + G] + ir(M - mo)}{mr(1 - cy + cy\ ty) + my\ ir} \times K^{-2b/(1+b)}\ (c\ lw/p)^{-(1-b)/(1+b)} \quad ... \quad (xxviii)$$

In the model where the Ls = lw W, solving (vi) and (vii) simultaneously, we have:

$$W = [lw^{-b}\ (1-b)K^bP]^{1/(1+b)} \quad ..... \quad (xxix)$$

Substituting (xxix) into either labour supply or the labour demand function yields, the equilibrium level of employment:

$$Le = [(1-b)K^b\ P\ lw]^{1/(1+b)} \quad ..... \quad (xxx)$$

Substituting (xxx) into (i)

$$Qe = K^{2b/(1+b)}{}_{[(1-b)P\ lw]}{}^{(1-b)/(1+b)} \quad .... \quad (xxxi)$$

Substituting (xxxi) into (xxvii)

$$P_e = Y^{(1+b)/2} K^{-b}[(1-b\ lw]^{-(1-b)/2} \quad .... \quad (xxxii)$$

The model where the supply is dependent on the fixed wage rate. It is perfectly rigid either downward or upward. The fact that there is an excess supply of labour over demand could not in any way lead to a downward pressure on the going wage rate. Hence,

$$W = Wo \quad .... \quad (xxxiii)$$

The equilibrium employment is obtained by substituting Wo into (ii), we have:

$$Le = [(1-b)K^{b}Wo^{-1}\ P]^{1/b} \quad .... \quad (xxxiv)$$

By going through the process in the first two models, we have:

$$Qe = K(1-b)^{(1-b)/b)}Wo^{-(1-b)/b}p^{(1-b)/b} \quad .... \quad (xxxv)$$

$$Pe = Y^{b}K^{-b}[(1-b)^{-1}Wo]^{1-b} \quad ..... \quad (xxxvi)$$

APPENDIX II

MONEY SUPPLY IN NIGERIA: 1969-1989

YEAR	MONEY SUPPLY M_1 (Nm) (1)	DEMAND DEPOSIT (Nm) (2)	CURRENCY OUTSIDE BANK (Nm)(3)	(2) AS A PERCENTAGE OF (1)	(3) AS A PERCENTAGE OF (1)	PERCENTAGE IN (1)	QUASI-MONEY (Nm)
1969	426.8					30.1	
1970	608.4	266.0	342.3	43.7	56.3	42.5	341.6
1971	629.0	274.4	354.5	43.6	56.4	3.4	376.4
1972	700.2	315.0	385.2	47.3	55.0	11.3	461.2
1973	827.2	391.3	435.9	47.3	52.7	18.1	586.9
1974	1,178.2	608.6	569.8	51.6	48.4	42.5	977.9
1975	2,044.1	1,015.4	1,030.7	49.6	50.4	73.5	1,578.4
1976	3,293.0	1,941.8	1,351.2	55.0	45.0	61.1	-
1977	4,794.4	2,853.6	1,940.8	59.5	40.5	45.6	2,255.1
1978	5,089.7	2,932.5	2,157.2	57.6	42.4	6.20	2,601.6
1979	6,146.6	3,795.8	2,350.8	61.8	38.2	20.8	3,702.1
1980	9,226.8	6,040.9	3,185.9	65.5	34.5	50.1	5,163.2
1981	9,744.9	5,883.0	3,861.9	60.4	39.6	5.6	5,796.1
1982	10,048.5	5,826.1	4,222.4	58.0	42.0	3.1	6,838.3
1983	11,282.4	6,439.6	4,842.8	57.1	42.9	12.3	8,082.8
1984	12,204.1	7,320.6	4,883.5	60.0	40.0	8.2	9,391.3
1985	13,267.8	8,355.5	4,909.9	63.0	37.0	8.7	10,550.8
1986	13,103.0	7,927.1	5,177.9	60.5	39.5	-1.2	11,487.7
1987	14,905.9	6,298.6	8,607.3	42.3	57.7	13.6	15,088.7
1988	21,446.4	12,032.8	9,413.6	55.5	44.5	43.9	18,397.1
1989	25,697.6	14,009.2	11,688.4	54.5	45.5	19.8	20,525.3

SOURCE: Obtained and computed from the data in the Economic and Financial Reviews of various issues of the CBN.

APPENDIX III

RATE OF INFLATION

YEAR	ALL ITEMS	CLOTHING	DRINKS	FOOD	FUEL & LIGHT	TOBACCO & KOLA-NUT	TRANSPORT	H/HOLD & OTHER PURCHASES	OTHER SERVICES
1969	9.9	3.6	1.5	1.9	7.0	2.3	2.4	2.3	3.6
1970	13.7	3.5	2.5	2.0	7.3	2.5	2.9	1.5	3.5
1971	16.1	13.4	4.2	2.4	10.5	4.5	3.9	3.7	4.5
1972	3.1	0.9	3.8	2.4	10.5	4.0	3.6	2.9	2.8
1973	5.4	16.9	18.5	3.2	-2.4	-3.4	9.9	1.5	9.1
1974	13.3	14.9	1.3	15.8	3.9	7.0	30.6	12.1	9.5
1975	33.9	27.2	39.9	41.8	40.0	3.7	15.3	37.9	15.2
1976	23.9	28.1	31.8	22.0	8.6	8.6	16.1	20.9	18.0
1977	15.4	10.4	6.3	19.7	17.2	68.6	21.5	13.2	23.3
1978	16.6	24.7	9.9	17.7	3.2	1.6	12.3	7.5	7.0
1979	11.8	24.3	14.2	8.0	27.0	9.1	23.4	6.1	14.1
1980	9.9	23.3	6.9	7.6	6.2	13.0	0.9	16.3	32.4
1981	20.8	16.1	2.7	25.2	-2.3	15.5	2.3	7.2	20.2
1982	7.7	6.7	7.4	7.3	3.9	4.9	12.8	9.9	4.9
1983	23.2	18.7	13.7	25.0	33.1	14.5	19.1	53.4	20.5
1984	39.6	40.8	23.1	42.9	12.8	36.9	16.4	57.3	38.9
1985	5.5	9.0	30.9	3.9	-4.5	25.8	13.1	5.0	23.3
1986	5.4	15.4	10.9	0.14	40.6	22.6	18.2	30.8	36.3
1987	10.2	11.9	8.6	8.55	4.3	14.1	13.2	18.3	21.8
1988	38.3	10.6	4.9	52.2	-5.5	8.1	15.7	3.0	7.4
1989	40.1	11.7	6.7	55.4	3.5	9.5	16.8	4.5	6.8

SOURCE: Same as Appendix II.

APPENDIX IV

ALL CITIES COMPOSITE CONSUMER PRICE INDICES:
1975=100

YEAR	ALL ITEMS CPI	CLOTHING	DRINKS	FOOD	FUEL & LIGHT	TOBACCO & K/NUT	TRANSPORT	H/HOLD & OTHER PURCHASES	OTHER SERVICES
1969	45.9	49.2	50.1	53.3	58.3	60.5	49.5	54.7	64.5
1970	52.2	50.1	55.2	55.4	60.2	79.0	54.3	59.5	68.3
1971	60.6	58.0	57.4	57.6	63.8	89.7	58.3	61.9	70.7
1972	62.5	58.5	59.6	59.0	70.4	93.3	60.4	63.7	72.7
1973	65.9	68.4	70.6	60.9	68.7	90.1	66.4	64.7	79.3
1974	74.7	78.6	71.5	70.5	71.4	96.4	86.7	72.5	86.8
1975	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1976	123.9	128.1	131.8	122.0	108.6	108.6	116.1	120.9	118.0
1977	143.0	141.4	140.1	146.0	127.3	183.1	141.1	136.9	145.5
1978	166.7	176.3	154.0	171.9	131.4	186.0	158.4	147.1	155.7
1979	186.3	219.1	175.8	185.7	166.9	202.9	195.5	156.0	177.7
1980	204.8	270.2	188.0	199.9	177.3	229.2	197.3	181.5	235.2
1981	247.5	313.7	193.0	250.2	173.2	264.8	201.9	194.6	282.7
1982	266.5	334.8	207.3	268.4	180.0	278.0	227.7	213.9	296.6
1983	328.3	397.5	235.7	335.6	239.5	318.4	271.2	328.1	357.3
1984	458.4	559.7	290.2	479.7	270.1	436.0	315.8	516.1	496.4
1985	483.7	610.3	380.0	498.5	257.9	548.7	357.2	542.0	612.2
1986	509.7	704.3	421.4	499.2	362.5	672.7	422.2	709.0	834.4
1987	561.6	787.8	457.5	541.9	378.1	767.5	478.0	839.1	1015.9
1988	776.5	871.4	479.8	824.7	357.3	829.5	552.9	863.9	1091.5
1989	832.2	882.1	491.2	850.2	360.2	847.4	578.1	898.0	1099.6

SOURCE: CBN: Annual Reports and Economic and Financial Reviews (various issues).

APPENDIX V

NET FOREIGN ASSET, DOMESTIC CREDIT, EXCHANGE RATE,
GOVERNMENT EXPENDITURE AND REVENUE, FOREIGN PRICE AND GDP

YEAR	NFA	DOMESTIC CREDIT	SHARE OF GOVT	EXCHANGE RATE N/$	GOVT REVENUE	GOVT EXP	BUDGET DEFICIT	FOREIGN PRICE	GDP
1969	148.2	1021	601	0.7143	246	541	-302	44.5	322.5
1970	154.0	1141	666	0.7143	463	573	-119	47.1	4219.0
1971	280.0	1127	532	0.6579	969	834	36	49.1	4715.5
1972	244	1274	518	0.6579	1023	898	37	50.8	4892.8
1973	414	1399	545	0.6579	1769	1207	404	53.9	5236.0
1974	3500	-176	-1310	0.6162	4190	2684	1487	59.8	5691.3
1975	3668	1161	-631	0.6267	4712	4740	-28	65.3	5831.2
1976	3396	3073	622	0.6308	5523	6580	-1130	69.1	6416.1
1977	2962	6010	2452	0.6514	6263	5255	1135	73.6	6881.0
1978	1420	7706	3143	0.6475	5645	3769	2122	79.2	6494.0
1979	3228	8662	3313	0.5445	8609	5448	2871	88.1	6875.8
1980	5607	10689	3539	0.5445	11628	2351	9184	100	6907.0
1981	2556	15746	6299	0.6369	7050	4134	2055	110	6546.0
1982	1057	21410	10328	0.6702	7500	15368.2	-7868.2	117.1	6405.7
1983	808	27590	15465	0.7486	6234	11525.0	-5290.9	120.9	5865.4
1984	1423	30423	17823	0.8082	7344	10169	-2900	126.1	5573.0
1985	1816	31900	18297	0.9996	9000	10185	-1999	130.5	5637.0
1986	4463	36409	18827	3.3167	12548	14468	-2774	133.1	5444.9
1987	6865	40209	21157	4.1408	17376	26081	-9702	137.9	9283.9
1988	7974	50680	27488	5.3530	15588	27749.5	-12161.3	141.2	7231.0
1989	20044	45865	188430	7.6508	16012.5	30781.0	-15768.5	144.5	7458.5

SOURCE: IMF: International Financial Statistics, various issues.

APPENDIX VI

MONEY SUPPLY, GDP AND VELOCITY

YEAR	MONEY SUPPLY ₦M	GDP AT 1962/63 FACTOR COST ₦M	VELOCITY
1969	426.8	322.5	0.76
1970	608.4	4219.0	6.93
1971	629.0	4715.5	7.50
1972	700.2	4892.8	6.99
1973	827.2	5236.0	6.33
1974	1178.4	5691.3	4.83
1975	2044.1	5834.2	2.85
1976	3293.0	6416.1	1.95
1977	4794.4	6881.0	1.44
1978	5089.7	6494.0	1.28
1979	6146.6	6875.8	1.12
1980	9226.8	6907.0	0.75
1981	9744.9	6546.0	0.67
1982	10048.5	6405.7	0.64
1983	11282.4	5865.4	0.52
1984	12204.1	5573.0	0.46
1985	13267.8	5637.0	0.42
1986	13103.0	5444.9	0.42
1987	14905.9	9283.9	0.34
1988	21446.4	7231.0	0.34
1989	25697.6	7458.5	0.29

SOURCE: Same as Appendix V.

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