MONEY SUPPLY, INFLATION AND NIGERIA'S ECONOMIC GROWTH (1980 -1995)

BY

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(M.SC/F ASS/01945/93-94)

BEING A THESIS SUBMITTED TO THE POSTGRADUATE SCHOOL, AHMADU BELLO UNIVERSITY, ZARIA IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF SCIENCE (ECONOMICS), DEPARTMENT OF ECONOMICS, FACULTY OF SOCIAL SCIENCES, AHMADU BELLO UNIVERSITY, ZARIA

SEPT, 1998

DECLARATION

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

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CERTIFICATION

We the undersigned hereby certify that this thesis titled "Money Supply and Inflation in Nigeria's Economic Growth (1980-1995)" was written by **Mr Ayashagba Gabriel Iorfa** and is found to have met the requirements for the award of the Master of Science degree (M.Sc.) in Economics of Ahmadu Bello University, Zaria and is hereby approved for its contribution to knowledge and literary presentation.

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DEDICATION

This thesis is humbly dedicated to:

Professor Charles G. Vajime
Vice-Chancellor
Benue State University, Makurdi

This is in recognition of his contribution to the academic upliftment in Benue State University, the only State University north of Nigeria.

Also, the work is dedicated to my wife to be-whoever will take up the challenge. And to those ladies who marry men not for **'what they are'** but for **'who they are'**.

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ABSTRACT

Price stability and economic growth are two complementary phenomena Macro-economic stability must be sustained in order to achieve a sustainable economic growth. This implies that aggregate demand must be consistent with the absorptive capacity of the economy. However, experience in Nigeria has shown that fiscal policies intended primarily to stimulate economic growth has been a source of macro-economic instability. Deficit budgets financed primarily by the banking sector have been a major source of financial imbalances. The resultant high inflation has powerful allocative and distributional effects on consumers and investors, which are often detrimental to this growth process. Consequently, the decision of maintaining monetary stability is a difficult one because of the uneasy trade-offs. The Federal Government has become increasingly dependent upon bank advances to pay wages and salaries and other material bills. Economic upsurging is, therefore, associated with an expansion of credit, the downsurging with a contraction.

The main objective of this thesis is to replicate tests identifying the line of causality between the money supply and the rate of inflation using Nigerian data and to show the implication of this causation of the growth of Nigeria economy between the period 1980-1995. The methodology adopted is that of Granger and the results show that there is a strong relationship between the money supply and inflation with the line of causation being bi-directional, that is, from the money supply to inflation and vice versa. Although such a bi-directional relationship exist only for present values of the money supply and not for lag values. The effect of the causal relationship between the money supply and the rate of inflation on the growth of the gross domestic product is, however, not significant

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CHAPTER ONE

INTRODUCTION

1.0 Introduction

The Nigerian economy can be described as a mixed economy. In other words, the private and public sectors co-exist. However, the public sector is nowadays a large sector directing the economy. That is, one cannot specifically locate the economy as operating a capitalist system or a socialist system.

Before the introduction of the Structural Adjustment Programme in 1986, the public sector was dominant in controlling over 70% of the economic sector (Ndebbio and Akpan: 1991:3). In their efforts to move away from the over centralization of production and to minimize inefficiencies, the authorities introduced the Structural Adjustment Programme (SAP) in 1986 with privatization and commercialisation of some public enterprises as a strategy (Ayodele 1988:24).

SAP was adopted as a radical approach to revamp the economy and to achieve the following objectives:

(i) Restructure and diversity the production base of the economy in order to reduce dependence on the oil over the period;

(ii) Achieve fiscal and balance of payment viability over the period;

(iii) Lay the basis for sustainable non-inflationary or minimum inflationary growth;

(iv) Lessen the dominance of unproductive investment in the public sector, improve the sector efficiency and intensify the growth potential of the private sector.

The main strategy of the Adjustment Programme included:

(a) The adoption of a realistic exchange rate policy coupled with the

liberalisation of the external trade and payment systems;

(b) Adoption of appropriate pricing policies in all sectors with a greater reliance on market forces and reduction in complex administrative controls; and

(c) Further rationalization and restructuring of public expenditures and custom tariffs.

With the introduction of this programme, inflationary pressures assumed a dimension of serious concern in Nigeria and are presently a major policy concern for the monetary authorities. The monetary authorities have made concrete efforts towards curtailing the level of inflation through the manipulation of money supply but despite these efforts the level of money supply is considered excessive in relation to the country's Gross Domestic Product (GDP).

Another feature of the Nigerian economy, which influences the growth of money supply, is the financing of the government budget deficits. The government budgets have, for a long time, until recently been financed either by small increases in taxes/or through the expansion of the money supply, that is, the monetization of the deficit. This to a large extent have accounted for the expansion in money supply and hence inflation in the economy. Besides, inflation has resulted from the upward pressure of production costs (cost-push inflation) or excess of aggregate demand. There is also structural inflation due to production bottlenecks and faulty marketing and distribution systems.

Inflation causes serious discomfort for consumers, investors, producers and the government in Nigeria. Since the 1960s, inflation rates as measured by the changes in the consumer price index (CPI) averaged 4.0 percent between 1960 and 1970, and the annual rates were contained in the single digit except in 1969 during the Nigerian Civil War, when it was estimated to be 10.0 percent (Asogu, 1993).

Its pressures were curtailed during the Civil War (1967 to 1970) because of the curtailment of income due to compulsory savings for financing the war and other restrictive economic fiscal and political measures.

The reconstruction measures and repayment of war bonds after 1970 resulted in the infection of massive private and public nominal expenditure into the economy. This period also witnessed sharp increases in government revenue in foreign exchange from oil exports. Thus the 1970s witnessed double-digit inflation rates which averaged 15.2 percent. Since then inflation has been on the increase causing serious distortions in both consumption expenditures and investment expenditures.

The rapid growth in government expenditures financed largely by the monetization of the petro-naira foreign exchange revenue, exacerbated expansionary pressures on money supply whose average annual growth rate for the 1970s and beyond was 32.5 percent compared with 7.5 percent in the 1960s (Asogu, 1993). However, from 1980 - 1988 gross domestic products grew negatively and declining incomes per capita partially confirmed that standards of living were falling. In addition, there was a high rate of unemployment, disequilibrium in the balance of payments, which exacerbated debt crisis, deteriorating social services etc it is now feared that the economy is suffering from stagflation. The inflationary policies so far employed by the authorities to cushion these negative effects of inflation have not yielded any significant positive impact, an indication that something more needs to be done.

1.1 Statement of Research Problem

Inflation is generally described as a situation of rapid, persistent and unacceptably high rises in the general price level in an economy, resulting to

general loss of purchasing power of the currency (Asogu 1993: 239). It is measured in Nigeria by the consumer price index (CPI) and Gross Domestic Product (GDP) deflator. Money supply on the other hand is the sum of all the money holdings of all the members of the society. Studies into the nature and causes of inflation in Nigeria started in the 1970s. This was the period when Government generated huge revenue from the sale of oil at very high prices during the 1974 Arab oil embargo on the United States of America. This huge revenue was pumped into the economy through high expenditure for development projects and the development of human capital (Ayashagba 1990:10).

At present and in almost all economies of the world, inflation has become a major concern of Government. This is because of its serious discomfort for consumers, investors, producers and the Government. Hence there is every need to always revisit this problem in order to ascertain its dimension.

In Nigeria, emphasis in the literature has been on the nature and causes of inflation attempts have not been made adequately to determine the causal relationship between the identified causes and inflation. In other developing countries, the identification of the existence of a causal relationship between the money supply and the rate of inflation continues to simulate research. Examples are Togan (Turkey: 1987), Fadil (Kuwait: 1989). Ya-Hwai Yang (Taiwan: 1990) and Parikh (Indonesia: 1990).

Those studies, which have tested the causality relationship between money supply and inflation, show mixed results, which are sometimes contradictory to each other. For example, for the United States, Jones and Uri (1987) found that during the period 1953 - 84, the money supply `caused' inflation, whereas Turnovsky and Wohar (1984) did not find any causal relationship for the period 1929 - 78.

In developing economies, the empirical research of the causal relationship between money supply and inflation is likewise contradictory with some studies indicating a bi-directional or feed back relationship (Aghevhi and Khan: 1978) and others a unidirectional relationship (Togan: 1987).

To a great extent, empirical analysis of the effects of monetary policy in African countries has been based on single equation models in which the nominal stock of money is treated as exogenous. The problem is that this implicitly assumes a one way causation between money, output and prices. Recent empirical evidence shows that causation between money and nominal output, and indeed, between money and the component of changes in prices is not always unidirectional. This suggests that the models may be mis-specified and the results may suffer from problems of simultaneous equation bias, which may lead to erroneous conclusions about the effects of policy changes on economic activity.

Several factors contribute to these inconclusive results. First, in virtually all of the studies, very little attention is given to evaluating the time series characteristics (Stationarity and cointegration) of the data employed. It is clear from the empirical literature that the application of conventional econometric techniques to non-stationary data can give rise to misleading results and erroneous inferences (See, for example, SIMS et al, 1990; and Fomby, 1991). The assumption of stationarity and the imposition of prior restrictions on the links among variables would lead to bias results because it left unexplored other channels of mutual dependence among variables. In essence, the question of whether or not to use level or difference data must be considered carefully prior to estimation and inference. Second, the inconclusive results could be due to the arbitrary assignment of lag lengths to variables used in the causality tests.

To overcome some of the inherent methodological problems of previous studies in this project, we examine the relationship between money supply, prices and output via the Granger technique. And to avoid erroneous conclusions we specify a simultaneous equation model (instead of a single equation) to provide a link between money-supply-inflation relationship and the Gross Domestic Product (GDP).

1.2 Objectives of the Study

The objective of this research is to test the causal relationship between money supply and inflation with reference to the Nigerian experience during the period 1980 to 1995. The project is meant to achieve basically the following specific objectives:

(i) To provide new evidence on the direction of causality between money supply and inflation for a developing economy.

(ii) To show the effects of money supply on the growth of the Gross Domestic Product (GDP) in Nigeria;

(iii To provide a means through which inflation or money supply can be adjusted or controlled via policy formulation in order to put growth in G.D.P on a steady state. This can provide additional insights into the channels through which monetary policy may affect economic activity.

In addition, this research represents one of the first attempts to examine causality between money supply and inflation in Nigeria. It is our modest contribution to knowledge.

1.3 Scope and Methodology

The study covers a period of 16 years from 1980 - 1995. This period covers the pre and post SAP periods and this period especially the post SAP period is very crucial in recent economic analysis in Nigeria. This period is also wide enough to permit the determination of the line of causality between money supply and inflation and its effects on economic growth.

The method or technique of analysis is the ordinary least square (OLS) which is applied under 99%, 95% and 90% confidence level depending of which level that indicates a causal relationship between inflation and money supply. The student t-test is used to test the significance of the estimated parameters.

1.4 Hypothesis

Specifically, the following hypothesis will be formulated and tested against the alternatives.

Hypothesis I: The growth of money supply ($M_1 + M_2$) does not cause inflation (measured by CPI): That is, a2 (L) = 0

Hypothesis II: The variation in the inflation does not cause the growth of money supply: That is $a_3(L) = 0$.

Hypothesis III The variation in the inflation does not have any significant positive effect on the growth of GDP: That is $b_2 = 0$.

Hypothesis I and II will be tested for the presence of unidirectional causality from money supply to inflation and unidirectional causality from inflation to money supply respectively. Hypothesis III will test the relationship between inflation and

the Gross Domestic Product. Rejection of hypothesis I would indicate that changes in domestic money supply causes inflation, while rejection of Hypothesis II would indicate that inflation causes changes in domestic money supply. If on the other hand both hypothesis I and II are rejected, a feed back or bi-directional relationship exists between money supply and inflation. Also a rejection of hypothesis III would indicate that changes in inflation affects the growth rate of real GDP.

In order to estimate the parameters of the models, Ordinary Least Squares (OLS) will be applied to the system of equations in equation (8), (11) and (12) in Chapter Four. The student t-test was used to determine the casual relationship between money supply and inflation in Nigeria and is given by:

$$t = \frac{b_i - \beta}{S_b} \text{ for } i = 1,2 \ldots\ldots \quad (1)$$

where $$S_b = \frac{Se}{\sqrt{Ex^2}} \ldots\ldots\ldots\ldots \quad (2)$$

$$\beta = 0$$

and is distributed in the t-distribution with N-2 degrees of freedom. It follows that in testing whether or not 'b' differs significantly from zero, we compute $|t| = |b|/S_b$ and refer it to the t-table with n-2 degrees of freedom. If *|t|* is outside the critical limits ta, we reject the null hypothesis and conclude that $\underline{a_2}L \neq 0$ and/or $a_3(L) \neq 0$. This was done under 95%, 99% and 90% confidence level depending on which level that indicates a causal relationship between money supply and inflation and vice versa. A similar test was carried to verify the relationship between inflation and the gross domestic product.

1.5 Sources of Data

Secondary data was used in this project. Information was obtained from Central Bank of Nigeria Publications such as Bullion, Economic and Financial

Review, Statistical Bulletin and Annual Reports and Statements of Accounts. The data is limited to a period of 16 years from 1980 - 1995.

1.6 Organisation of Work

This work is divided into five chapters. Chapter one is the introduction, which basically takes care of the statement of problem, methodology, hypothesis and objectives. Chapter Two contains the theoretical framework and literature review while Chapter Three presents the origins and developments of trends in inflation, money supply and the Gross Domestic Product in Nigeria. In Chapter Four the model is specified and empirical results presented and analysed based on the two models and the hypothesis tested using the student t-test and deductions are drawn. The last Chapter, Five, contains the summary of the whole work, conclusions and appropriate recommendations.

CHAPTER TWO

THEORETICAL FRAMEWORK AND LITERATURE REVIEW

2.0 Inflation and Money Supply Defined

According to Webster's Seventh New Collegiate Dictionary (7th Edition), inflation can be defined as "an increase in the volume of money and credit, relative to available goods resulting in a substantial and continuing rise in the general price level." Three essential aspects of this definition are worthy of note. It recognises first that inflation cannot occur unless there is an increase in the volume of money and credit; this increase exceeds available goods and services; and this leads to a substantial and continuing rise in the general price level.

If we grasp these three elements we many understand the whole concept of inflation; bearing in mind that this demand is over goods and services, that it is money and credit which make our demand effective and that economic theory tells us that if demand increase, while supply remains the same, prices will rise. In line with the above, Nwankwo (1972) defined inflation as "excess of demand over supply at current price."

In another development, one British Chancellor of the Exchanqer, Mr. Thoney-Croft, sees inflation simply as "to much money chasing too few goods."

Whether we take either of the definitions we shall be clear in our mind that inflation has four essential characteristics. One is the increase in demand. But there will be no inflation if the increase in demand simultaneously results in a proportionate or higher increase in supply. If increase in demand must, lead to inflation, then there must also be a second factor, which is limitation of supply. But a limitation of supply will not necessarily lead to inflation unless the third factor is

present. This is an increase in money supply. In essence, inflation is essentially a state of disequilibrium in which the community is struggling to acquire more goods and services than are available and which lead to persistently rising prices.

On the other hand, the supply of money at any moment is the sum of all the money holdings of all the members of the society. This could be either M_1 or M_2. M_1 (that is, notes and coins issued by the Central Bank of Nigeria plus Bank deposit held on current accounts and transferable by cheque) is used to define money supply in Nigeria in the narrow sense. M_2 (the broader definition of money) defines money as M_1 plus time and savings deposits with banks and non-bank financial institutions like the Federal Mortgage Bank, Federal Savings Bank, Finance Houses etc and investments in other financial assets such as Treasury Bills, Treasury Certificates, Stocks and Savings Bonds etc.

Ajayi and Ojo (1981) defined money supply in Nigeria as the total sum of currency outside the banks, demand deposits at commercial banks, domestic deposits with the Central Bank, less Federal and State Governments demand deposits at Commercial Banks. They proved that the preponderance of the money supply in Nigeria consisted of currency outside banks. From all indications, the definition given by Ajayi and Ojo entails that money supply in any economy at a particular time is the sum of M_1 and M_2. This work will also adopt this definition.

2.1 *Theory of Money Supply*

The theory of money supply and its importance in the economy presupposes that there exists a relationship between the supply and demand for money on the one hand and such economic aggregates like the general price level, output, income, savings and investments on the other.

Apparently, three schools of thought do exist over this issue and each advancing its own argument. In an article by Otiti (1982: 14) he stated:

"The first school referred as Milton Freidman (1956) school of thought holds that, changes in the stock of money are closely related to changes in the price level and through it, in other general economic aggregates." However the relationship does not seem to be quite precise and rigid. The advocates further posited that " changes in the supply of money are a consequence as well as an independent cause of changes in income and prices and that when they occur, they will in turn further effects on income and prices (Ibid:14).

The second school of thought is the Keynessian school named after Keynes (1936) which stresses that "money plays a role in the determination of real output, general price level and other macroeconomics variables" (Ibid:14). In the same line of argument they posited out that "a change in the money supply may change the level of output via changes in interest rates (Ghatak 1981:8).

In the Keynesian model, equilibrium income depends on two vital conditions, which are that:

(a) Planned savings must be equal to planned investment, and

(b) At any point in time, supply of money must equal demand for money. The argument as they further stretched it postulates that, if interest rate is manipulated to equate supply and demand for money, and also savings to investment, then investment, income level and prices in an economy will be altered. Therefore in order to achieve desired level of money supply and trend in the economy, monetary authorities would have to be altering the interest rate.

In classical theory, monetary policy affects the economy by changing the quantity of money in the face of the stable demand for money, so that, beginning

in equilibrium, if the money supply increases there will be an excess supply of money, and that excess supply of money spills over into spending and thus stimulates income. In a Keynesian world, the initial impact of a change in the money supply is on the rate of interest through the liquidity preference aspect of the demand for money. The rate of interest then affects investment and investment through the multiplier, income (Chicks 1978:1). In line with their argument, Robinson (1938: 509) concedes that an increase in the quantity of money might result in a rise in the price level, but only if it leads to a reduction in the rate of interest, which stimulates investment and discourages savings (Tavlas 1981: 317 - 337). Thus the causal role of money is seen to operate strictly through an indirect portfolio adjustment channel.

Some theories rely on additional relationships, for example, the influence of monetary changes on wealth and the subsequent effect of wealth on consumption, or the effect of inflation on the money rate of interest. Some have recognised that changes in the money supply change not only the interest rate on financial assets but also the valuation of capital stock, thus affecting the desire to invest. Another strand of thought which also relies on the concept that money is a component of a portfolio of assets comprising real as well as financial assets emphasises that money supply changes will alter the balance of that portfolio, creating interest rate changes and thus changes in spending.

But to a considerable extent these sophisticated and "more realistic" theories are simply alternative means of reaching the same conclusion that monetary policy will be effective in combating depression rather than inflation.

Contrary to the above opinions, the third school of thought championed by Radcliffe seems to look at the issue a little bit different. In this argument, Radcliffe

attempts to distinguish between demand for money and demand for liquidity. He believes that demand for money is not the same as demand for liquidity. Fundamentally his main reason was simply because of the availability of interest yielding money substitutes, which people can, with some degree of ease, convert to cash whenever they want. Hence "monetary policy confined to regulating money supply is not inflation since the significant variable is not money per se, but the supply relative to demand for it" (Otiti 1982:14).

The presence of money substitutes as identified by Radcliffe seem to be within the framework of the earlier Chicago school which identified two possible courses of disturbance to velocity of money: (a) the existence of abundant money substitutes and (b) the influence of price expectations (Douglas 1935: 24-27; knight 1948: XLIV; Mints 1945: 218-222). The policy prescription for the former factor was the well-known Chicago preference for 100% reserve requirement (Tavlas 1981:537). The influence of price expectation in turn was dealt with in the context of a monetary rule. The favoured rule among the earlier Chicago group was price level stabilization. Thus, if the monetary authorities acted to offset variations in velocity with opposite variations in the quantity of money, the general price level could be stabilized and price expectations would act to produce stability. The relation between such a monetary rule and price expectations was stated succinctly by Mints (1946: 40-41).

> "If a policy of monetary (i.e. price level) stabilization prevailed, the general expectation would be, not that an upward or downward trend in prices would or might continue, but that it would very quickly cease and possibly be severed.... In brief, a policy of monetary stabilization would transform expectations from frequently distabilizing factor into a prevailing stabilizing influence of the first importance (Mints 1946: 40 - 41)

What emerges from the forgoing analysis is that an unstable velocity of circulation

is the modus operandi of economic fluctuations.

2.2 Theory of Inflation

The literature is rich with several approaches for the explanation of inflation. the six most popular are the Keynessian demand-pull, cost/wage-push, monetarist, behaviourist,structural and internationally transmitted inflation.

The Keynessian approach to the study of inflation is from the income side rather than the money side. In his simple model, the general price level is determined by the scale of output (employment level) and the money wage unit. This is so because the money wage level was fixed and the market for goods and services taken to be perfectly competitive (Bull 1982:62). Hence the money wage level, the marginal product of labour was made equal to the real wage. Thus:

$$MP = W/P \quad \ldots\ldots\ldots\ldots\ldots\ldots (3)$$

where MP = Marginal product of labour

W = Money or nominal wage

P = Price level

W/P = Real wage

By re-arranging equation (3) we obtain

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

It therefore implied 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.

Assume that 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 a new wage rate. The action of price increases leads to disequilibrium in the money market, because an increase in prices increases the level of money income, which leads to increases in the transactionary demand for money. Since the stock of money is fixed, additional money for transaction 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 old employment level. If this happens, supply of labour will be greater than demand for labour 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.

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? The effect of the relaxation on employment of a shift in nominal wage rate may be zero, the same thing holds if there is an increase in government expenditure (Adebisi 1991). If there is an upward shifts 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 employment that should have resulted. In the same vain, money supply can be increased to maintain the old employment at the new wage rate and new price levels.

Thus, when labour unions 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 increases in wages. This will eventually result in wage price spiral.

The demand-pull theory posits that a rise in price level is initiated by the emergence of excess demand over existing supply, assuming the existence of full-employment in the economy. The amount of inflationary pressure will depend upon the size of the excess demand (Asogu 1993:241). Demand-pull inflation could be approach through either quantity theory of money (neo-classical) or Fiscalist/Keynessian theory. The quantity theory emphasises the causal influence of money supply in the inflationary process, but the fiscalist theory emphasises non-monetary influences such as government expenditure and credit. However, analysis shows that the two approaches on several countries inflationary experience indicate that an increase in aggregate demand was either stimulated or accomplished by increase in money supply or government deficit expenditure, financed by the Central Bank (Asogu 1993:241) thereby creating excessive money.

According to available literature, excessive monetary creation usually arising from the sustained pursuit of expansionary fiscal and monetary policies have the tendency of putting the economy in a permanent state of excess demand, as long as aggregate supply of goods and services does not expand as rapidly as the aggregate demand owing to the existence of bottlenecks and rigidities. In other words, whether price will rise in response to a demand stimulus depends on the extent of out-put expansion. In Nigeria, the persistent pursuit of expansionary fiscal and monetary policies coupled with inadequate response of output has been the major causes of inflation. While the fiscal deficit increases aggregate demand directly, the components of the deficit financed by the banking system, especially

the CBN, constitutes a significant factor in secondary expansion of aggregate demand. The extent of increase in demand will depend on the portfolio preferences of individuals and the interest and exchange rate policies, since the increase in money supply is large investment opportunities in the real and financial sectors are limited, significant proportion of the increase in money is allocated to purchases of goods and services for consumption.

The cost-push theory view inflation from the supply side. Its proponents believe that inflation is as a result of the rising of factor prices. This occurs under conditions of imperfect market in the product market (administered prices) or in the labour market (wage push). In other words, the cost-push inflation is 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. Generally, cost-push inflation has been associated with autonomous increases in wages and salaries and depreciation of the exchange rate. If the growth of wages outstrips the growth of labour productivity, entrepreneur raise the prices of their products to prevent a decline in employment and output. Mark-up inflation models are usually grouped with cost-push inflation models because, for the former, product prices and wages are both assumed to be cost-determined. Business mark-ups cover the estimated cost of over head costs and required profit margins, hence, this can also be turned profit push inflation. Sometimes it is profit that becomes the major determinant of prices. Prices rise because firms raise their prices autonomously in order to cover the cost of wages and salaries and at least make marginal profit.

The structuralists are of the view that excess demand over supply cannot be arrested through increase in output due to structural rigidities and defect in developing economies. Hence they emphasize that inflation results from the

manifestation of basic structural factors which create supply shortages and inadequate government revenue to pay for imports to augment inadequate domestic supply. Thus, structural inflation is said to result from supply shocks including insufficient foreign exchange supply for financing importation (Onitiri and Anosika 1982: 271-385). According to this theory 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 under developed countries, which are basically agrarian and whose agricultural products could not rise to match with the high demand of the populace. A part from the shortage of production in the sector, it has witnessed serious neglect through rural-urban migration which further aggravates the food shortages in such an economy. In addition to these bottlenecks in the sectors are 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 shortage vis-à-vis the growing population, which leads to constant price, increases.

The behaviourist, on the other hand, holds that there is nothing incompatible between consumption growth and price stability. The central problem lies in the distributive share of the various income groups and in the reactions of those groups to their income especially whether they are "spenders of income or savers of income." In contrast to the structuralist, they neglect factor mobility and price flexibility reactions in various sectors of the economy. There is much inter-dependence among the views, such that, their differences often come down to

matter on emphasis. They do suggest that every effort should be made to identity the causes of inflation in a given economy, so that appropriate policy measures can be undertaken since each economy has its peculiarities.

Internationally transmitted inflation, otherwise called imported inflation, concerns openness of economies. This approach identifies a number of channels whereby inflation may be transmitted from one country to another, especially under a regime of fixed exchange rates. The channels include price, demand and liquidity effects. Price effects are transmitted by internationally traded goods and services; demand effects by the spillover of excess demand across countries. Changes in foreign reserves, occasioned by balance of payments adjustment, affect money supply, income and prices, thereby creating liquidity effects. Thus Nwankwo (1982) noted that "as long as we continue to operate an open economy, as long as we pursue and execute our development policies, as long as we do not produce but have to import the necessary and indispensable raw materials and intermediate and capital goods for our development, and so long as the prices of these imports continue to rise in supplying countries, so long shall we be importing inflation."

Of central importance to this research is the monetarist theory. The monetarist hypothesize that inflation is always and every where a monetary phenomenon and maintain that a policy of monetary and financial stability is a necessary pre-requisite for rapid economic growth. The classical monetary explanation of the price movements is centred on the changes in the stock of money. Milton Friedman (1956) in his "the optimum quantity of money" categorically stated that all other factors like demand pull, cost-push, profit-push, structural based etc that caused inflation in an economy all attribute price movement to the (socially) misguided behaviour of particular individuals or groups

and that these alternative explanations play little or no role in either long run or large movements in prices, though they may cause short and minor movements as they indirectly affect the supply of money.

Thus this school posit changes in the stock of money as closely related to changes in the price level and through it, in other economic aggregates. However, the relationship does not seem to be quite precise and rigid. 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 has been a major proximate source for the accompanying inflation (Asogu 1993:242).

The crude monetarist position relates price changes to money income velocity, output and money supply equation (exchange equation).

$$MV = PY \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (5)$$

solving for P and take the logarithm of equation (5)

$$\log P = \log M + \text{Log } V - \text{Log } Y \quad \ldots\ldots\ldots \quad (6)$$

Differentiate equation (6) with respect to time

$$1/P \frac{dp}{dt} = 1/M \frac{dN}{dt} + \frac{dV}{dt} - 1/Y \frac{dY}{dt}$$

where M = denotes money supply

V = velocity

P = price level

Y = income

$1/P \frac{dP}{dt}$ = the rate of inflation over time

$1/M \frac{dM}{dt}$ = the rate of monetary expansion over time

$1/Y \frac{dY}{dt}$ = the rate of change of real output over time

$1/V \frac{dV}{dt}$ = the rate of change of velocity over time

The basic views of the monetarists is that money plays a significant role in an economy and money supply influences the periodic movement of economic activity and especially the magnitude of income and price variables.

While the old quantity theorists believed that an increase in money supply would bring about a direct proportionate increase in prices, the monetarist hold the view that the general price level determines the purchasing power (real money balances) a community will hold. If prices rise a community's demand for real balances increases. The monetarist model is basically a model for the demand for money and not a money-supply model. The demand for money model of the monetarist is not intended to offer explanations regarding changes in output, employment, money income or the price level, as does the Keynessian model. In the monetarist demand for money model, money is regarded as an asset (wealth) with no yield except implicit yields such as convenience and security, but which has to be treated like production factors or commodities. Its demand depends on total wealth, the prices and yields of money assets in terms of other substitute assets, tastes and preferences.

By implication, the monetarist seems to suggest that the Pull factor of the inflation and money supply relationship be from the inflation side. This means that, while other theories view the relationship from money-supply side, the monetarist has a contrary view. Hence the researcher will try to investigate the line of

causality of the relationship between money supply and inflation. In another development Robinson (1938:509) concludes that an increase in the quantity of money might result in a rise in the price level, but only if "it leads to a reduction in the rate of interest, which stimulates investment and discourages saving." Thus the causal role of money is seem to operate strictly through an indirect portfolio adjustment channel.

In theory, there is a difference between a natural rate of interest and a market rate of interest. The former is the rate at which demand and supply of capital are in equilibrium. The market rate changed by the bank frequency diverges from the natural rate. When it is below the expansion of credit will be excessive and when it is above the natural rate, credit facilities will be seriously restricted. Only when the two rates are equal will there be stability. But such stability will only be achieved in a static economy. In a dynamic economy the two rates are bound to diverge rather than converge. Certainly expansion and contraction of credit go hand in hand with slum and boom.

In a boom, when profit margins are expanding, a higher rate of interest may however have little effect in cussing inflation as it can be easily absorbed. In recession, when the business climate is bleak, a low rate of interest can do little (if any) to induce investors to replenish stocks which they cannot dispose.

2.3 Review of Empirical/related Literature

On the basis of the above theories we review some empirical works as done by some other researchers in Nigeria and the world over. As earlier stated, most literature on inflation in Nigeria are mainly on the nature and causes of inflation and measures by which the level of inflation can be curtailed. Very little (if at all) has

been done on testing the line of causality between inflation and any of the variables identified as a cause in the economy.

As noted by Asogu (1993), the Central Bank of Nigeria Research Department (1974) did a cross-section analysis of the origins and developments of inflationary trends in African countries, including Nigeria, to determine the impact of inflation on their growth. In particular, the impact of changes in money supply, deficit financing, real domestic product on price changes was investigated for Nigeria and six other African countries for the period 1960 - 1970. In the case of Nigeria current changes in money supply and domestic credit had no significant change on changes of price level. However, real income, the third variable, had a correctly signed regression coefficient in a multiple regression with a 0.60 coefficient of determination. Using quarterly data and lagged changes in money supply, coefficients for one and two quarter lags produced significant regression coefficients, leading to a conclusion that changes in real income, money supply and its lags, affect rates of inflation in Nigeria.

Similarly NISER (1975:110) under took another research and money supply and government expenditure was found to be equally influenced in the determination of inflation rate in Nigeria. Conclusions drawn from this research were that :-

(a) Changes in money supply and its lags; changes in government expenditure, as well as limitations in real output, are the major forces determining inflationary tendencies in Nigeria. However the contribution by Ajayi and Teriba put greater emphasis on supply shortages as the main explanation of the Nigerian inflation than changes in money supply (Ajayi and Ojo 1977:112-125).

(b) The strong influence of imported inflation, as a propagating factor in the inflationary process, was identified also as being responsible for inflation in Nigeria. Since the incidence of imported inflation is synonymous with fixed exchange rate regime, a case for a policy of flexible exchange rates was suggested as an anti-inflation measure.

(c) The observed nature of disequilibrium between supply and demand was said to be due to inadequate domestic production, especially food production, resulting from low productivity caused by poor infracstural development.

Finally, direct price controls were regarded as ineffective instruments to control inflation, if the inflation was caused by such other factors as wage increases, adverse balance of trade and balance of payment positions.

In Akinnifesi (1977:60) six simultaneous structural equations were solved to contain a single equation which relates inflation rates to changes in domestic credit which in turn is determined by other factors such as exports, balance of payments and changes in external resources. The results based on data from 1962 to 1980 indicated a significant positive relationship between inflation rates and increases in domestic credit. In the second study Akinnifesi (1984: 61-75) considers more factors such as changes in money supply, lags changes in money supply, credit to government by the banking system and the government deficit expenditure. The study emphasized that increases in government expenditure financed by the monetisation of oil revenue and credit from the banking system were responsible for the expansion of money supply, which in turn, with a lag-in-effect contributed immensely to inflationary tendencies.

Osakwe (1983 :4-18) attempts to ascertain the amount of government expenditure which affect money supply during 1970 - 1980, and investigated the

empirical relationship between changes in net current government expenditure, money wages, money supply (current and lagged), and prices, using quarterly and annual data. The regression analysis includes a dummy variable to capture the effect of price control in force between 1972 - 1978. Significant statistical relationship obtained from the analysis indicated strong relationship between increases in net government expenditure and growth in money supply on the one hand and growth in money supply and inflation on the other. Further increases in money wage rates and money supply (with lag-in-effect) were identified as the two most important factors which influenced the movement of prices between 1970 and 1980. Government price control did however have some minimal dampening effects on price increase.

Ajayi and Awosika (1980)in their work indicated that inflation in Nigeria is determined largely by developments in the external sector, but complemented by internal influences. Specifically, their findings show that the openness of the economy is highly correlated with inflation. Similarly, Pinto (1987) has supported this argument by maintaining that monetization of the foreign exchange earnings from crude oil export vastly expanded the growth of M_1 and it constituted the most significant factor to explain movements in the general price levels in the 1970s and early 1980s. In other words, this is the so-called internationally transmitted inflation, otherwise called imported inflation.

Adeyeye and Fakiyesi (1980: 309-320) hypothesize that the main factor responsible for inflationary tendencies in Nigeria has been government expenditure. The thrust of their argument is that massive expenditure on defence and social service, which do not lead to the production of any tangible goods, would intensify inflation. Using time-series data, spanning 17 years up to 1977, they tested the

hypothesis that the rate of inflation in Nigeria is linearly related to the rates of growth of money stock, government expenditure, especially deficits, and growth of government revenue, especially monetization of foreign exchange from oil exports. The results established some significant positive relationship between inflation rate and growth in bank credit, growth of money supply and growth in government expenditure, while the relationship with growth of government revenue was unclear.

A more recent work by Asogu (1993: 248) in his analysis he attempted to sort the major contemporary causes of inflationary tendencies in Nigeria without being drawn into the controversy found in economic literature on causes of inflation. He utilized a general econometric model to identify and assess the relative contribution of the important factors responsible for inflation in the Nigeria economy. His findings have shown that "changes in real income are always significant and have an inverse relationship with the rate of inflation. Also, the food price changes dominate all other variables and that money supply variable and its lag are not always significant at least if annual data are used in the estimation. In addition, domestic credit and government expenditure variables are either not significant or significant with wrong sings."

Asogu further observed that "the inflation rates recorded in 1985 and 1986 were attributed to improved supply especially of food items as well as restraint in the expansion in aggregate demand. The very high rates of inflation since 1988 to 1989 was attributed to several factors namely general increases in the cost of production of both agricultural and industrial goods as a result of the continued depreciation of the naira, removal of some consumer goods without adequate domestic supply". This indeed is a juxtaposition of the cost-push, structural and demand-pull inflation.

However, Ladipo (1973) of the Department of Agricultural Economics, University of Ife, reviewed that it is necessary to modify our conception of inflation in view of the particular features of the country Nigeria, claiming that while demand-pull, cost-push inflation could be identified, we must add what he called 'developmental inflation and inflationary tendencies of hoarding' which is a result of inadequate storage facilities.

In another development, Prof. Oyenuga (1982) stated that current inflationary trend, aggravated by energy and monetary crisis is a world-wide problem from which a country like Nigeria cannot be immune as it is a phenomenon that is of interest to everyone in this country. He further stated that it brings considerable hardship to the honest salary and wage earner in an economy in which salaries and wages have remained static in the midst of wild inflationary winds. The farmer is not free from its effects while the shrewd businessman and commercial houses enjoy the inflationary boom, particularly when it is accompanied by under-production, scarcity and hoarding of essential goods which are in high demand.

On the line of causality between inflation and its 'cause variables' especially money supply in some developing countries, results shows that in some countries there exist a bi-directional or feedback relationship while in others a uni-directional relationship. For instance, Aghevli and Khan (1975) conducted a research for developing countries and established that there exist a bi-directional relationship between money supply and inflation. Togan (1987) in a similar study found a uni-directional relationship. Jones and Uri (1987) found during the period 1953-1984 that the money supply 'caused' inflation in United States whereas Turnousky and Wohar (1984) did not find any causal relationship for the period 1929-78. More

recently Beltas and Jones (1993) found between 1970 to 1988 that there is a uni-directional relationship between inflation and money supply in Algeria.

As a whole, studies in the nature and causes of inflation and remedies has been carried out exhaustively. But very little (if at all) has been done on causality. Although some works on causality for other countries has been done as mentioned earlier. In Nigeria, this research will be a first attempt to determine the line of causality between money supply and inflation in the period 1980-1995 and it will present a new evidence for policy formulation.

2.4 Inflation and Growth in Nigeria and Other Developing Countries

This research will not make enough meaning if it stops at just determining the causal relationship between money supply and inflation. The work intends to move a step further to provide the basis for formulation of policy through which the growth of the economy will be enhanced. This calls for a review of literature or theories that concerns growth and inflation in an economy.

Different economists have made different postulations on the impact of inflation on GDP growth rates. This study, therefore, is based on the postulations specified by theory and on Nigerian data. The researcher will, however, avoid being overwhelmed by empirical observations on the economy.

The first theoretical proposition in that inflation retards growth. This proposition is supported by various arguments:

(a) that by raising real consumption/income ratio, inflation would reduce resources available for investment;

(b) that inflation would adversely affect real savings;

(c) that inflation tends to alter the pattern and composition of investment in such

a manner that investment which are not conducive to high and sustained growth are favoured;

(d) that strong inflation would adversely affect the external sector of the economy since inflation is likely to reduce the country's ability to export, increase her propensity to import and consequently reduce the level of reserves (Hagins,1959: 404).

Contrary to the above is the view that inflation can propel growth by changing income distribution in such a way as to cause increase in the rate of savings and investment. In the view of its proponents, this can occur in two ways:

(a) as a consequence of unanticipated inflation (or of anticipated inflation to which people are unable to adjust by raising their money incomes to maintain their real income), there may be a shift of income between wage earners and profit earners;

(b) even if inflation is fully anticipated, there may be a shift in the distribution of income towards the government, and perhaps to banks and their borrowers as a consequence of the operations of the so-called inflation tax (Ayre, 1970: 76).

The first model in predicted upon the possibility that when demand increases and prices rise, not all prices rise at the same rate. In particular it is likely that wages will lag behind the rising prices for sometime, with a consequent rise in profits. This distributional change can only be reversed if wage earners are able to adjust by putting in place measures to restore their wages. Thus, assuming that the inflation is unanticipated, profit receivers have higher propensities to save and invest than wage earners and hence, the overall savings and investment ratio in the economy will rise and growth will be favourably affected. Moreso, if the wage

earners failed to get an upward adjustment in their money income to compensate for the inflation, growth cannot possibly be effected.

The inflation-tax model on the other hand, is based on the fact that inflation acts as a tax on money holdings, while the model as propounded by Cogan and Bailey (1956) emergent from the monetarist tradition, its application to the developing countries take a structuralist slut, since it can be argued that if tax yields from other forms of taxation cannot be increased, the inflation tax can form the basis for increasing the government share in the gross domestic product and as a consequence, the government can expand its growth promoting expenditure.

The main work on Nigerian inflation and economic growth is that of Osakwe (1974: 23-24). In order to establish the relationship between inflation and economic growth, he utilized the Spearman's rank correlation coefficient and a regression analysis using the ordinary least squares (OLS). He found that, the observed relationship between rates of price changes and economic growth, price changes and growth in private investment did not conform to general expectations in Nigeria. The rate of price changes was observed to be moving in the same direction instead of the opposite direction with growth in output and investment. However, further investigation on the side of investment showed that price increases have encouraged large-scale inventory accumulation. This is an indication that gross fixed private investment necessary for long-term growth could have been larger without inflation. The results obtained on imports and consumption conformed with the hypothesis, namely that there is a tendency for imports and consumption to rise during an inflationary situation. The results obtained for exports and saving were not statistically significant and statistical evidence based on those variables were, therefore inconclusive. The result seems

to be inconclusive as Osakwe has obviously remarked that "the overall statistical results must be interpreted with caution. First, Nigeria cannot be said to have experienced a lengthy period of high inflation during the period covered by the study. Secondly, in all empirical evidences based on Nigeria and other developing countries, statistical data relate economic factors; non-economic factors were excluded because they were not amenable to statistical analysis".

In other developing countries, U. Tun Wai and Graeme Dorrance (IMF 1965) in their studies have obtained the following results. In the first instance, there is no consistent relationship between the rate of inflation and the rate of economic growth in developing countries. They have also observed that growth has been possible without inflation in some countries, while in others, there has been inflationary tendencies with growth, and even negative growth in others. In addition, the same rates of growth have been on the average in countries with minimal inflation rates. Countries with stable prices account for the highest growth rates followed by strong inflationary countries. The conclusions obtained from these studies, support the view that inflation should not be used as a bench mark of growth; however, if it must be used, strong inflation produces better results than a mild one. This would be seen to oppose the widely held hypothesis that while strong inflation is harmful to growth, gentle rising price level may have a favourable impact on growth. It must, therefore, be either that the belief is misplaced or that the empirical test is faulty.

The research department of the CBN on African economics on the relationship between inflation and economic growth differ significantly from earlier studies. These studies focused attention not only on the relationship between inflation and output growth but also on the relationship between inflation and those variables such as gross fixed investment, savings and balance of payments,

imports, exports and reserves. Six out of eleven countries tested, Egypt, Gabon, Ghana, Ivory Coast, Kenya and Sudan showed signs of price variable that suggest an inverse relationship between inflation and growth. However except for Nigeria, none of the estimated relationships was significant at 5% probability level. The countries were further grouped according to strength of inflation and the relationship between inflation and economic growth was examined for each group of countries for the period 1965-1970, the result of nominal price change and mild inflation countries suggest that a positive relationship exist between inflation and growth. An inverse relationship was suggested for the relative price stable countries. A group estimation of the regression coefficients was not statistically sufficient as it was in the case of individual countries. The results were, therefore, inconclusive.

The association, between inflation and gross fixed investment, inventories, investments, saving, exports, imports and reserves were examined but yielded inconsistent results. In most cases where the hypothesis was confirmed, the coefficient of price was insignificant to justify firm conclusions. The overall inconclusiveness followed from the assumption that price was the only important variable, which could influence each of the variables and ignored other important factors. Furthermore, none of the countries for which data were available could be said to have been subjected to lengthy periods of high inflation.

Using a cross-sectional and time series data of a sample of 69 developing countries from 1973 to 1988,Khan (1990) found that there was a significant negative relationship between inflation and the growth rate of the economy. Khan and Villameda (1991) using cross-sectional and time series data for 23 developing countries from 1975 to 1987 found that the growth rate of per capita output was

significantly and negatively related to the rule of money supply.

Hence, this research work in attempting to establish the relationship between money supply, inflation and economic growth will cover a period between 1980 - 1995. The relationship will be done in two stages: (a) from money supply to inflation; and (b) from inflation to economic growth. It is expected that this will provide a new evidence for policy formulation that can sustain economic growth.

CHAPTER THREE

ORIGINS AND DEVELOPMENTS OF TRENDS IN INFLATION MONEY SUPPLY AND THE GROSS DOMESTIC PRODUCT (GDP) IN NIGERIA

3.0 Inflationary Trends in Nigeria

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% in the first seven to eight years. It became noticeable in 1969 and became stronger in the 70s. The 1970s witnessed double digit inflation rates which averaged 15.2 percent engendered mainly by the monetization of foreign exchange receipts during the oil boom era and massive construction activities at the end of the civil war (Adebisi, 1991).

The rise in the price level was also attributable 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 (Onitiri and Awosika, 1975: 271-385).

In an attempt to curb the widespread inflation, the price control decree of 1970 was promulgated. This degree established a board, which as empowered to impose prices on a wide range of essential commodities, e.g. textiles, timed 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 wage 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 renumerations in the private sector can be rationalised and harmonised with those in the public sector. As it could be expected, when this wages and salaries commission was announced, sellers raised the prices of items in the market.

Inflation declined in 1972 to 3.1%. The rate of inflation in food items was 2.4%, Tobacco and kolanut ranked second at 4.0% after fuel and light. The low rate of inflation in the year was traceable to the moderation in the increases in the prices of clothing especially that of locally produced stuffs. 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 to 5.4% and increased through to 1978 with an annual rate of 18.1% over these years. The main cause of inflation at this period was the excess of 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 were responsible for the increases in inflation within this period.

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) to examine the then inflationary tendencies in the economy and identify their causes;

(ii) to 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 control board be set up 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. In addition they recommended that 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 21.2%, perhaps as a result of the effectiveness of certain anti-inflationary measures taken in the year. For example, certain essential goods were imported and distributed by the Nigerian National Supply Company through the public institutions, government offices and co-operatives. 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 22.2% in 1976.

As at 1977, when the money supply dropped, the price level further dropped to 15.4% and increased by 1.12% by 1978 to 16.16%. But this was short lived as the prices went down to 11.8%, 9.9% by 1979 and 1980 respectively. 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. Also the importation of goods and the slow pace of monetary expansion was responsible for the low rate of inflation in 1980.

This trend changed in 1981 when the inflation rate jumped to 20.9%. This was reflected majorly in the price of food component that rose sharply. It, however, fall sharply to 7.7% in 1982. The drastic fall in the level of inflation in 1982 was due largely to the monetary policies of that year which were designed "to accelerate the rate of domestic production, maintain a healthy balance of payment position, reduce the rate of domestic price inflation and mobilise domestic capital formation" (CBN 1982: 115).

The rate of inflation picked up in 1983 from 7.7% in 1982 to 23.2% in 1983. This was due to the general scarcity of consumer goods as a result of hoarding and the sharp increase in money supply. This was 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 in urban-based areas were highly responsible for the price increases in this year.

The trend of inflation further shut up in 1984 from 23.2% in 1983 to 39.6% in 1984. By 1985 and 1986, the trend fell drastically to 5.5% in 1985 and 5.4% in 1986. This was due largely to the upward or improved domestic supply situation and the restraint on the expansion of aggregate demand and especially in the areas of government spending and a moderate rate of monetary expansion. This was supplemented by the rise in the domestic production of manufactured goods. The fall in inflation within this period can also be explained by the reduction in personal income through the tight monetary and fiscal policies pursued in the period which were embedded in the Structural Adjustment package (Ayashagba, 1991). 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.

From 1987 through 1989, inflation rate increased astronomically from 5.4% in 1986 to 10.2%, 38.3% and 40.9% in 1987, 1988 and 1989 respectively. The major factors accountable for this are probably the money supply, shortage of food-stuffs, increase in the cost of production stimulated by the devaluation of the naira exchange rate and high rate of interest and this was aggravated by the removal of subsidies on some agricultural and industrial inputs, with the ban on the importation of some consumer goods without adequate domestic supply, increases in government expenditures, through high powered money (mainly from CBN), accentuated demand pressures and by first quarter of 1994, inflation mitted 57.4% from 45.6% in 1990, 52.7% in 1991, 70.1% in 1992 and 57.2% in 1993.

Table 3.1: Inflation Rate in Nigeria (1970-1995)

Year	1970	1971	1972	1973	1974	1975	1976	1977	1978
Inflation Rate (%)	13.8	15.6	8.2	5.4	13.4	33.9	21.2	15.4	16.6

Year	1979	1980	1981	1982	1983	1984	1985	1986	1987
Inflation Rate (%)	11.8	9.9	20.9	7.7	23.2	39.6	5.5	5.4	10.2

Year	1988	1989	1990	1991	1992	1993	1994	1995
Inflation Rate (%)	38.3	40.9	45.6	52.7	70.1	57.2	57.4	74.3

Source: Federal office of statistics Lagos.

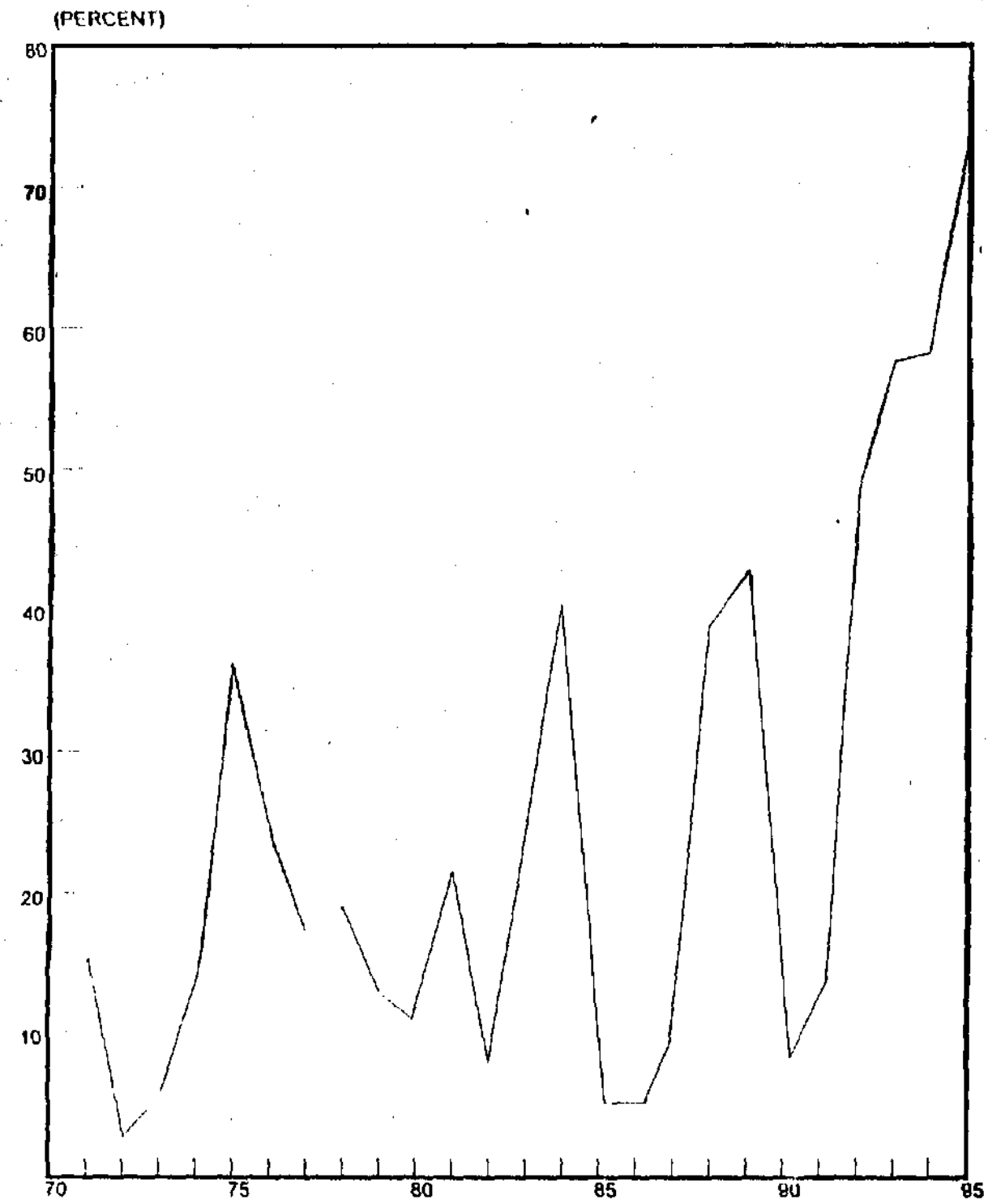


Figure 1: Inflation Rate (Percent) in Nigeria (1970-1995)

In essence, the rate of domestic inflation which dropped sharply in 1990 picked up during the second quarter of 1991 and continued through 1992. Data from the Federal Office of Statistics (FOS) showed that the average all items composite consumer price index (CPI) for the twelve months period, January-December 1992, stood at 478.4 (1985=100). This represented an inflation rate of 70.1% compared with 52.7% in the preceding year (See table 3.1). The continued pressure on the price level during the year was attributed mainly to the huge government fiscal deficit financed wholly by the CBN which resulted in excess liquidity in the banking system. Another contributory factor was the substantial depreciation of the naira exchange rate (which contributed to the significant increases in virtually all prices). The food index rose by 46.5% compared with 11.9% in the preceding year. Although there was good harvest of staples during the year food prices recited sharply to the high costs of farm inputs and transportation (See Table 3.2. and 3.3).

Table 3.2 Composite Consumer Price Index (1985 = 100)

Year	All items	Food	Drinks	Tobacco & kola	Accommodation, Fuel & Light	Household Goods and other Purchase	Clothing	Transport	Other Servic
1970	10.8	9.0	14.5	16.1	-	-	9.2	16.2	11.4
1971	12.5	11.6	15.1	16.3	-	-	9.6	16.3	11.5
1972	12.9	11.8	15.7	17.0	-	-	9.8	16.9	11.9
1973	13.6	12.2	18.6	16.4	-	-	11.0	18.6	13.0
1974	15.4	14.1	18.8	17.6	-	-	12.9	24.3	14.2
1975	20.7	20.1	26.3	18.2	-	-	16.4	28.0	16.3
1976	25.6	24.5	34.7	26.0	42.1	22.3	21.0	32.5	19.3
1977	29.6	29.3	36.9	33.4	49.4	25.3	23.1	39.6	23.8
1978	34.5	34.5	-	33.9	50.9	27.1	28.9	44.3	25.4
1979	38.5	37.3	-	37.0	64.7	28.8	35.9	54.7	29.0
1980	42.3	40.1	-	41.8	68.7	33.5	44.3	55.2	38.4
1981	51.2	50.2	50.8	48.3	67.2	35.9	51.4	56.5	46.2
1982	55.1	54.6	54.5	50.8	69.8	39.4	54.8	62.7	64.7
1983	67.9	67.3	62.0	58.0	92.9	60.5	65.1	75.9	58.4
1984	94.8	96.2	76.4	79.5	104.7	95.2	91.7	88.4	81.1
1985	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1986	105.4	105.4	100.1	122.6	140.6	130.8	115.7	118.2	136.3
1987	116.1	116.1	108.7	139.6	140.6	154.8	129.1	133.8	165.9

Note: Figures not provided because of the intermittent review of the composition of the items in each component of the consumer price index 1970-1987.

Source: Federal Office of Statistics, Lagos.

Table 3.3 Composite Consumer Price Index (1985 = 100)

Year	All items	Food	Drink Tobacco & Kola	Clothing & Footwear	Acc. Fuel & Light	House-hold Goods	Medical Care & Health	Transportation	Rec. Ent. Educ. & Civil Service	Other Services
1988	181.3	195.3	137.6	162.2	138.7	179.2	154.6	151.2	165.7	142.5
1989	272.7	298.1	212.1	243.2	181.0	290.9	192.5	247.4	228.2	193.9
1990	293.2	308.0	267.4	305.0	217.0	328.3	240.2	291.3	263.1	231.5
1991	330.2	345.9	305.3	376.5	226.3	411.4	290.3	314.5	307.1	287.3
1992	478.4	506.8	460.2	498.4	298.3	617.9	443.6	440.7	405.7	412.2
1993	853.0	883.9	893.8	838.4	598.8	1114.5	790.8	928.4	844.9	698.8
1994	1271.6	1258.3	1268.9	1139.0	1207.4	1500.2	1235.1	1827.0	1293.6	1233.3

Source: Federal Office of Statistics, Lagos

The trend in price movements was the same in both Urban and rural areas. However, the increase was more pronounced in the urban centres. The average all items urban consumer price index stood at 414.2 with 1985 as base year, representing an increase of 495% compared with 17.8% in 1991. All components recorded higher prices in the urban centres than in the rural areas except accommodation, fuel and light and other services (CBN 1992: 113). The rural index at 471.4 (1985 = 100) also increased by 43.6%. This was accounted for mainly by transportation cost whose index rose by 31.6% compared with 6.8% a year earlier.

This trend continued unabated through 1993. By the end of 1993, inflation stood at 57.2% compared with 44.6% in 1992. The continued pressure on the price level during the year was exacerbated by the huge government fiscal deficit financed largely by the CBN which resulted in excess liquidity in the banking system and substantially increase in domestic aggregate demand. Other factors were increase in production cost including interest rates and high transportation costs arising from sharp rise in the prices of petroleum products.

The monetization of financial deficits by CBN continued to exert pressure on inflation up till 1994. Although there was an insignificant drop in the rate of inflation by 0.02%, as the rate stood at 57% in 1994 compared to 57.2% in 1993. This pressure on the general price level in 1994 was also attributable to phenomenal increases in transportation costs following the upward adjustment of the prices of petroleum products.

At 174.6 (1985 = 100), the food index which accounted for 69.1% of the total household expenditure rose by 46.8% compared with 57.9% in 1993. High cost of transportation and farm inputs contributed largely to the increases in food prices. The index of transportation rose by 116.9% compared with 60.3% in 1993. The increases in the non-food components of the index ranged from 53.1% for clothing and footwear to 122.6% for accommodation, fuel and light (CBN 1993: 116). The trend in price movement was the same in both the urban and rural areas, although prices were relatively higher in the urban centres. The average all items urban consumer price index stood at 1,317.1 (1985 = 100) representing an increase of 58.6% compared with 61.4% in 1993. The prices of all components of expenditure increased ranging from 54.8% for clothing and footwear to 118.1% for accommodation, fuel and light. At 1, 154.2 (1985 = 100) the rural index also increased by 56.7%. All component items in the basket continued to this increase. The food index rose by 47.1% while the non-food indices ranged from 52.9% for clothing and footwear to 123.7% for accommodation, fuel and light.

The situation became worse in 1995, when inflation rate rose to 74.3% from 57% in 1994. The reason were same as that of 1994.

3.1 Money Supply in Nigeria

The growth of money supply since independence in the first decade has been quite moderate with annual growth rate of 4.5%. The rate of increase became very noticeable during the civil war period, precisely in 1967. At the end of 1969, money supply figure was put at ₦429.8 million, about 30% higher that the preceding year. The

trend fall sharply in 1971 to 3.4% . Even though the magnitude of the total money supply increased, the percentage change dropped. 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%. Both component of the total money supply increased proportionately. This general rise in the money supply over this period of time was accounted for by credit from the banking system. The government expenditure at this period increased tremendously because of the civil war especially due to the rehabilitation of the war affected areas after the war. Another factor that accounted for the expansion of the money supply was the monetization of the foreign reserves.

This trend continued in 1974 when the percentage change shut up to about 42.5%. By 1977, the average annual percentage increase in money supply was about 55.7%. This figure is more than double that of 1969 to 1973.

The major expansionary factors during the period were the substantial increase in credit to the government necessitated by the huge post war commitment for reconstruction and rehabilitation. Another factor was the rapid monetization of the foreign exchange earnings from oil. The expansion in money supply was further enhanced by the Udoji Award of 1974/75 when there were sharp increases in the salaries and wages, accompanied by the payment of substancial arrears in both the public and private sectors. Thus, in the first four months of 1975, money supply increased by 46.6% compared with a rise of 9.2% of the same period of 1974.

Between 1974 to 1978, there was a continuous increase in deficit financing through the monetization of the banking system. Hence the pattern of money expansion was still high. This pattern was, however, interrupted in 1978 because there was a fall in total credit that goes to both the government and the private sector which dropped by about 33.7% and 35.4% respectively. 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 government and the continuing monetization of the oil revenue whose price in 1980 increased three times. There was an increase of $4.21 or 14.0% per barrel 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 June1, 1980. All these increases affect the monetization 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% from 50.6% in1980. The main contractionary factor was the sharp fall in the foreign asset (net) of the banking system.

It fell from a tune of ₦5, 007 million to ₦2,556M 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. However, there was a moderate increases of about 3.1%. The same factors that accounted for money in 1981 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 budgeted 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% for 1983/85. The only factors that accounted for the increase are expansion in the bank

credit to government, increase in the net foreign assets and other assets (net) of the banking system.

There was, however, a small fall in1986 by about 1.2% . This was due to the fall of ₦6.6 billion in the asset (net) of the banking system and the ₦936.9M accreditation to quasi-money. The fall in other assets could be accounted for by the rapid build-up of the 'other' liabilities of the CBN naira lodgements in respects of foreign payment arrears which could not be affected 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 ₦4,509 million increase in bank credit to the economy.

By 1987, there was an expansion in money supply by about 11.8%. This went up to 15% in 1988. During the year 1988, there was also a 2.5% expansion in credit to government as compared to 1.5% in 1987. Credit to the private sector increased by 13.3% in1988 as compared to 7.4% in 1987. This was due largely to the need to stem the adverse social consequences of SAP while consolidating its gains which dominated economic policy measures of the year.

The monetary policies of 1989 and 1990 were, however, restrictive. They were aimed at dampening of inflationary pressures, curbing of excessive monetary expansion, streamlining of government revenue expenditure imbalance, moderation of exchange rate fluctuation, vigorous implementation of all existing measures designed to boost non-oil export receipts.

In this vain, the rate of growth of money supply (M_1) was slashed from the 14.65% ceiling in 1989 to 13% in 1990. Aggregate bank credit to the economy were

permitted to grow at 13.5% in 1990, up from 9.5% in 1989. The rate of growth of bank credit to private sector was still pitched higher at 15.8% than the government sector, 10.9%. In view of the above measures, monetary and credit policy which has since 1989, been designed specifically to curb excessive demand pressures and stabilise the economy had some salutary impact especially in its moderating effects on the growth of monetary aggregates during the first half of 1990. However, monetary growth accelerated in the second half, resulting in a cumulative increase of 18.8% in narrow money (M_1) in the first three quarters of the year compared to the 13.0% growth target for fiscal 1990 and the 15.6% observed in the corresponding period of 1989. The broad money supply measure (M_2) also recorded a significant growth of 19.8% compared to 4.5% in 1989, indicating that the economy was still excessively liquid as shown in Table 3.4.

In 1991 and 1992, money supply grew this years at a pace exceeded only by the all time record increase witnessed at the peak of the oil boom in 1975. Then, the unusually large rates of growth of money supply were traceable to the monetization of the relatively large revenue from oil exports. However in 1992, the big jump in money supply was mainly due to the unduly large amount of government borrowing from the Central Bank. The rise in money supply in the year, furthermore, marked highly significant acceleration in the steep and inflationary trend in money supply growth which has persisted since 1988.

The narrow measure of money supply (M_1) expanded by ₦32, 800.5 million or 66.4% , while broad money (M_2) grew by ₦49,127 million or 57.0%.

Table 3.4 Money Supply in Nigeria (₦ million)

Year	Currency Outside Banks (1)	Demand Deposits	Money Supply (M1) (2)	Demand Deposit as % of Money Supply	Quasi Money (3)	Money Supply (M2)
1970	342.2	266.0	608.3	43.7	341.6	949.9
1971	354.5	274.4	628.9	43.6	376.4	1005.3
1972	385.2	314.9	700.1	45.0	461.2	1161.3
1973	435.9	391.2	827.1	47.3	586.9	1414.0
1974	569.8	608.5	1178.3	51.6	977.9	2156.2
1975	1030.7	1013.3	2044.0	49.6	1578.4	3622.4
1976	1540.0	1941.8	3293.0	59.0	1985.9	5278.9
1977	1940.0	2853.6	4794.4	59.5	2263.1	7057.5
1978	2157.2	2932.5	5089.7	57.6	2609.8	7699.5
1979	2350.8	3795.8	6146.8	61.8	3710.6	14397.4
1980	3185.9	6040.9	9226.8	65.5	5170.6	14397.4
1981	3861.9	5883.0	9744.9	60.4	5803.2	15548.1
1982	4222.4	5826.2	10048.6	58.0	6845.4	16894.0
1983	4842.8	6439.6	11282.4	57.1	8086.5	19368.9
1984	4883.5	7320.6	12204.1	60.0	9396.4	21600.5
1985	4909.9	8357.9	13267.8	63.0	10550.8	23818.6
1986	5177.9	7927.1	13105.0	60.5	11487.7	24592.7
1987	6298.6	8607.3	14905.9	57.7	15088.7	29994.6
1988	9412.3	11736.3	21148.6	55.5	21631.7	42780
1989	11688.4	14009.2	25697.6	54.5	20523.3	46222.9
1990	14940.6	22293.1	37233.7	59.9	27699.0	64902.7
1991	23108.2	26256.3	49364.5	53.2	36788.0	86152.5
1992	36765.9	38406.8	75172.5	60.0	53111.2	128283.7
1993	56260.8	60129.9	11390.7	41.7	76067.9	192458.6
1994	90492.0	81512.7	172004.7	47.4	95255.1	267759.1

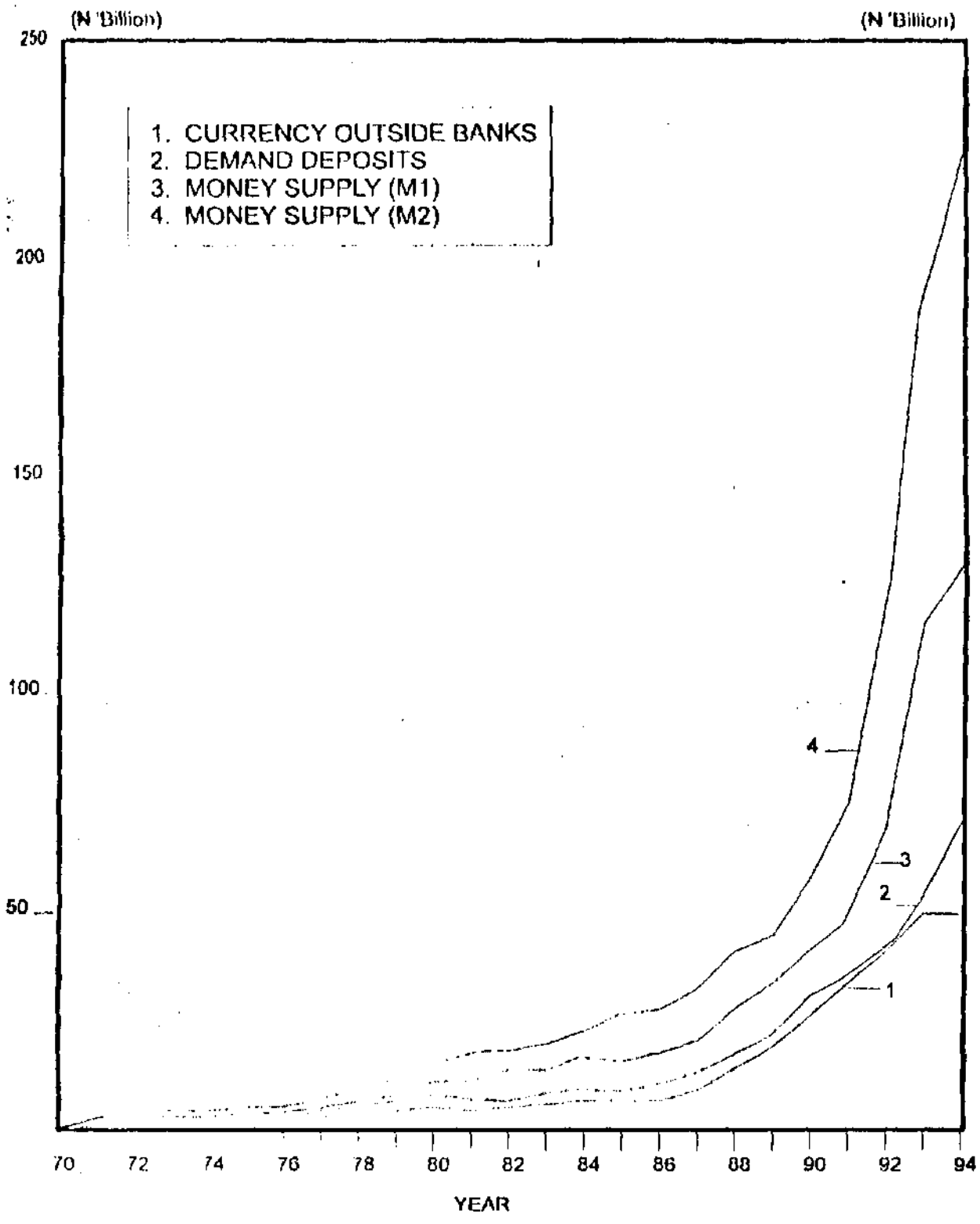


Figure 2: Money Supply in Nigeria (1970-1994)

(1) Currency outside banks is defined as currency in circulation less vault cash in commercial banks and merchant banks.

(2) Money supply (M_1) is defined as currency outside banks plus privately held demand deposits with commercial banks and Central Bank.

(3) Quasi-money is defined as savings and Time deposit with commercial banks

plus total deposit liabilities of merchant banks. Prior to 1988, quasi money did not include the deposit liabilities of merchant banks.

(4) Money supply (M_2) is composed of M_1 and quasi money as defined above.

Source: CBN Statistical Bulletin, Vol. 5, No. 2, 1994; P.6

The increases were substantially above the high and inflationary trend of money supply growth over the four year period 1988-1991, which averaged 35.2% and 28.6% for M_1 and M_2 respectively. Both components of M_1 rose sharply in 1992 unlike in the previous year when the bulk of the expansion in M_1 was in currency outside banks. The latter grew at the rate of 59.1% compared with 54.7% in 1991, while banks deposits rose by 72.9% in the year compared with 17.5% in the previous year.

The main source of M_1 growth during the year was the rise in primary money resulting mainly from government borrowing from the target rate of growth of banking system credit to the private sector. Aggregate banking system claims on both sectors increased by ₦61,693.1 million or 73.6% compared to ₦26,148.8 million or 45.3% in the previous year. Another expansionary factor in M_1 was the million or 45.3% in the previous year. Another expansionary factor in M_1 was the system's other assets (net) which rose by ₦644.1 million or 11.8% reflecting the rapid increases in the other assets of both the Central Bank and commercial banks. The resultant growth in M_1 was, however, moderated by the sharp fall in foreign assets (net) and the substantial rise in quasi-money. Net foreign assets, a dominant factor in 1989 and 1990, dropped by ₦19,209.2 million or 32.7% in contrast to the ₦13,962.7 million or 31.1% rise in 1991.

The fall reflected the persistent decline in Central Bank's external holdings, particularly during the last five months of the year. Quasi-money representing commercial bank's savings and time deposits and merchant banks deposit liabilities, increased by ₦16,327.1 million or 44.4% compared with the ₦9,119.0 million or 33.0% rise in 1991.

Contrary to the stated stance of monetary policy in 1993, the growth of money supply accelerated further during the 1993 fiscal year. Narrow money (M_1) grew at more than twice the rate considered appropriate in relation to the expected growth of real output and the objective of curbing the high and rising rate of inflation. As had so often been the case in the past, government borrowing at the Central Bank constituted the main driving force in the excessive monetary expansion. Private sector credit which is usually the major focus of measures of monetary restraint grew moderately during the year for reasons unconnected with the supply of reserve balances at the disposal of the banks. At ₦116,593.4 million, at the end of December 1993, M_1 rose by ₦411, 186.9 million or 54.6%, up from 52.8% in the previous year and considerably above the average rate of increase in the three year period ended 1992. Broad money (M_2) rose by 52.8% compared with 49.2% in the previous year. M_1 fell in the first quarter of the year, rose sharply in the second quarter and maintained the acceleration in the third and fourth quarter. The growth in the second quarter was influenced jointly by relatively large increases in foreign assets (net) and aggregate credit while the acceleration in the third and fourth quarters was almost entirely fuelled by the surge in net credit to government.

In 1994, however, the growth of money supply decelerated narrow money (M_1), and broad money (M_2) supply grew by 47.8% and 39.1% during the year as compared with the increases of 54.4% and 49.8% respectively, in the previous year. The slow down not withstanding, the expansion in M_1 was substantially higher than the target rate

of 21.4% and 15% for the year. Most of the increase in money supply occurred in the fourth quarter and was driven largely by the growth in wet credit to the government. The impact of such credit growth on money supply was reinforced in December by the sharp rise in net foreign assets of the Central Bank.

Reflecting the large increase in banking systems, credit to the private sector in the first quarter and the surge in net credit to government in the second quarter, the growth in money supply in the first half of the year exceeded the target rate on an annualized basis. In the third quarter, however, the disruptions in economic activity contributed to a sharp deceleration in the growth of bank credit and this, coupled with a sharp decline in the net foreign assets of the banking system, resulted in a substantial decline in the money supply. At ₦125,094.8 and ₦225,117.1 million at the end of September, M_1 and M_2 showed increases of 7.5% and 17.0%, respectively, above the previous and December levels. In the fourth quarter, M_1 further grew by 40.3% to ₦172,004.1 million, following sharp increases in net credit to government and the net foreign assets of the Central Bank. Broad money (M_1) similarly climbed by 22.1% to ₦26, 759.8 million.

In terms of the components of M_1, the major development was the increase in currency relative to demand deposits. The demand deposit component of M_1 rose sharply in the first half of the year, declined sharply in the third quarter and rose by end December by 35.6% to ₦81,512.7 million. Currency outside banks by contrast showed no growth in the first half but rose sharply in the second. At ₦90,492.0 million, it increased by 60.8% and accounted for 52.6% of M_1, thus exceeding for the first time the deposit component of M_1.

3.2 Money Supply, Inflation and Economic Growth

As observed from the above analyses, it is noted that money supply (M_1) expanded rapidly especially during the period 1986-1995. From negative growth of 4.1% in 1986, the money supply which picked up in 1987, rose substantially in 1988 by 43.6% Subsequently, monetary expansion fell to 21.5% in 1989, fluctuated upwards to 54.4% in 1993 and started to decline in 1994. In 1995, the money supply expanded by only 8.1%. The major factor underlying the movement in narrow money is the growth in the fiscal deficit which was largely financed by the CBN. For instance, the financing of government fiscal deficit by the CBN increased form 24.5% in 1987 to 91.6% in 1991 and has remained high since then.

The trends in the growth of money supply and inflation in Nigeria tends to support the general view that inflation is largely a monetary phenomenon. In fact, a recent study in the Research Department of the CBN for the period 1960 to 1994, confirmed that growth in the money supply is the major determinant of inflation in Nigeria. In the periods of high monetary growth (1988, 1990, 1992, 1994), inflation surged accordingly, though with some lag. As the increase in narrow money rose from 4.1% in1986 to 43.6% in 1988, the inflation rate increased from 5.4% to 38.3% during the same period. Following the lagged response of inflation to monetary growth, inflation peaked at 50.5% in 1989. Similarly, when the money supply growth increased substantially from 32.6% in 1991 to 54.4% in 1993, inflation accelerated also from 13.0% in 1991 to 57.2% in 1993.

On the other hand, as a result of the contractionary fiscal and monetary policies pursued in 1989, the inflation rate dropped significantly from 50.5% in 1989 to 7.5% in 1990. With the decline in monetary growth since 1994, the inflation rate which peaked at 74.3% in 1995, had declined significantly to about 50% by June 1996. Although there is

a strong link between increases in the money supply and inflation, other factors such as capacity utilisation rate, rainfall and exchange rate movements, do influence inflationary pressures.

Inflationary developments have obviously had some negative consequences on the economy. For instance, when inflation increased from 7.4% in 1990 to 57.2% in1993, the growth in economic activities, as reflected in the movement of the GDP, declined from 8.3% to 2.3%. This goes to confirm the emerging consensus that high inflation tends to engender low economic growth ultimately. For instance, a study by the World Bank in1995 showed a close relationship between rising inflation and diminishing growth rates across a variety of inflation ranges. The negative influence of inflation on economic growth could be traced to its effects on both aggregate demand and supply in the economy. Inflation by reducing consumers purchasing power, leads to a fall in the growth of aggregate demand. This could lead to increase in business inventories and further reduction in production. On the supply side, inflation increases the cost of the factors of production (capital, labour, raw materials, etc) and leads to uncertainty in business planning. These factors constrain investment which is critical to growth. Going by this analysis, the observed growth trend in Nigeria during the period could be linked to high inflationary pressures.

CHAPTER FOUR

MODEL SPECIFICATION, DATA PRESENTATION AND ANALYSIS

4.0 Model Specification

The model adopted is that of Grangger (1969) who formulated a definition of 'causality' between economic variables which he used in empirical research. He postulated that if a variable [x(t)] caused another variable [Y(t)], then [Y(t)] would be better predicted using the past values of [Y(t)] and [x(t)] together than using only the past values of [y(t)] alone. Thus

$$E[(t)] - E\ Y(t)/x(t).\ Y(t)] < E[y(t) - E[y(t)/Y(t)] \quad \ldots\ldots\ldots\ldots\ldots\ldots (7)$$

The right hand side of equation (7) above shows the forecast error of [Y(t)] using only the information available on [Y_t] (while thee left-hand side shows the forecast error of [Y(t)] using information available on [Y(t)] and [$x_{(t)}$]; (where $t < 0$).

(a) The Granger direct causality test is presented as follows: Let [P(t), M(i, t)] represent the discrete bivariate time series on inflation and the growth of the money supply ($i = M_1 + M_2$) where 't' measures the basic time interval. The series M(i,t) and P(t) follows a stable auto – regressive process:

$$\begin{bmatrix} P_t \\ \\ M_{(i,t)} \end{bmatrix} = \begin{bmatrix} a_1(L) & a_2(L) \\ \\ a_3(L) & a_4(L) \end{bmatrix} \begin{bmatrix} P_t \\ \\ M_{(i,t)} \end{bmatrix} + \begin{bmatrix} e_1t \\ \\ e_2t \end{bmatrix} \quad \text{---------- (8)}$$

Where 'L' is a backshift operator on 't' and [e_1t , e_2t] □ $N(0,\Sigma)$ and 'Σ' is a diagonal matrix.

e_1t and e_2t are the disturbance terms and are assumed to be mutually uncorrelated . i.e.

$$\mathbf{E}\begin{bmatrix} e_1t \\ \\ e_2t \end{bmatrix} = 0 \quad \text{---------- (9)}$$

Bivariate causality from $M(i_1t)$ to P(t) for example compares the projection of P(t) on its own history [Pi: i<t] and on the set [M(i,t), Pi: i<t] (Geweke 1982:304 – 313).

(b) The second model is used to provide a link between real growth rate in the Gross Domestic Product and the money supply-Inflation causal relationship. This model becomes important in order to determine the effects of this causality on GDP so as to provide a means to control money supply and/or inflation for sustainable economic growth. This model is built on the premise that a rapid increase in the rate of money supply has two adverse effects on the growth of G.D.P. First, an acceleration of the rate of money supply leads to inflation which threatens macroeconomic stability thereby discouraging the propensity to invest. Second, the expected increase in the rate of inflation reduces private propensity to save

Furthermore, there is no doubt that positive interest rates promote the growth of money markets, enhances the marginal productivity of capital, and raises the propensity to save. Recent studies have shown, however, that financial reforms have failed to achieve their objectives in many developing countries. To combat the problem of economic stabilisation programmes, commercial banks supervision have been strengthened. Firms have been encouraged to reduce their dependence on bank credit and to move towards equity financing. All these are intended to reduce the vulnerability of firms to shocks caused by interest –rate liberalisation, one of the principal causes of cost –push inflation.

Thus, the effects of monetary policies on the rate of economic growth are transmitted through the effects of the rate of inflation and real interest rates on the level of private investment and its productivity. High rates of money supply usually leads to inflationary pressure. It is therefore necessary to establish the relationship which exist

between inflation and growth performance in Nigeria. Thus the effect of inflation on the growth rate of GDP could be estimated by this model:

$$GR = b_o + b_1 IP + b_2 It + b_3 R \qquad \ldots\ldots\ldots(10)$$

$(B_o)\ (B_1)\ \ (B_2)\ \ (B_3)$

where GR = Growth rate of real GDP

IP = Ratio of Private investment to GDP

It = Growth Rate of Inflation

R = The Growth Rate of Nigeria's Exports.

$b_o, b_1, b_2\ \ b_3$ are constants or parameters.

Holding other variables constant, the effect of inflation on the growth rate of GDP can be estimated. In order to estimate the actual impact or effect of inflation on GDP, the following structural equations are necessary:

$$I_1 t = \alpha_1 + b_1 MS + U_1 t \qquad \ldots\ldots\ldots\ldots\ldots\ldots\ldots(11)$$

$$GR = \alpha_1 + b_2 I_1 t + U_1 t \qquad \ldots\ldots\ldots\ldots\ldots\ldots\ldots(12)$$

Where $1_1 t$ = growth rate of inflation.

$\hat{I}_1 t$ = estimated rate of inflation base on equation (11)

Ms = growth rate of money supply

GR = growth rate of Real GDP

$$\text{And } \alpha_1 = \bar{I}_1 t - b_1 \overline{MS} \qquad \ldots\ldots\ldots\ldots\ldots\ldots(13)$$

$$\alpha_2 = \overline{GR} - b_2 \bar{\hat{I}}, t \qquad \ldots\ldots\ldots\ldots\ldots\ldots(14)$$

$$b_1 = \frac{\Sigma mi}{\Sigma m^2} \qquad \ldots\ldots\ldots\ldots\ldots\ldots (15)$$

$$b_2 = \frac{\Sigma igr}{\Sigma i^2} \qquad \ldots\ldots\ldots\ldots\ldots\ldots (16)$$

Where $\overline{I}_1t$, $\overline{MS}$, $\overline{GR}$ are the means of observed inflation, money supply and the growth rate or real GDP respectively while $\overline{I}_2t$ is the mean of estimated rates of inflation. Equation (11) above estimate the influence of money supply on inflation while equation (12) is to estimate the relationship between induced inflation (actual inflation that results from money supply) and the growth of real GDP. This two equations are formed on the assumption that all other variables that influence inflation in equation(11) and the real GDP in equation (12) are included in the disturbance terms U_1 t and U_2 t which are also assumed to be uncorrelated with the explanatory variables. The parameters b_1 in equation (11) is expected to be positive while b_2 in equation (12) is expected to be negative.

4.1 Data Issue

The analysis of causality between money supply and inflation and its effect on economic growth is tested using annual data drawn up from Central Bank of Nigeria publications such as Bullion, Statistical Bulletin, Annual Reports and Statements of account (Table 4.1). The data is limited for the period of 16 years from 1980 to 1995.

Table 4.1 Inflation, Money Supply and Gross Domestic Product (%) 1980 –1995

Year	Inflation (%)	Money Supply (%)	GDP (%)
1980	9.9	14.4	5.48
1981	20.9	19.3	-26.81
1982	7.7	3.5	-0.37
1983	23.2	12.3	-13.92
1984	39.6	18.6	4.33
1985	5.5	8.7	9.38
1986	5.4	8.7	9.38
1987	10.2	15.7	-047
1988	38.2	43.6	9.91
1989	40.9	21.5	7.39
1990	45.6	44.89	8.20
1991	52.7	32.7	4.63
1992	70.1	66.4	4.12
1993	57.2	52.8	2.30
1994	57.0	39.1	1.00
1995	74.3	10.3	2.2

Source: Federal Office of Statistics, Lagos.

The growth of money supply was measured using both the M_1 definition (i.e currency held outside banks and demand deposits) and the M_2 definition (M_1 + quasi money which includes time deposits). Inflation was measured by taking the annual percentage change in the consumer price index (CPI). The growth in the gross domestic product was also measured by taking the annual percentage changes. The trend in this three variables is presented in the previous chapter.

4.2 Empirical Results

(a) *Testing the Causality between Money Supply and Inflation*

Using the data series describe above, the Granger test was applied in order to determine the direction of causality between changes in money supply and inflation over

the 1980-1995 period. The test was carried out using Ordinary Least Squares (OLS). The results of correlation of the variables is also presented to show the degree of association. The estimated results are as follows:

Regression and correlation Analysis of two variables

Independent Variable - Money supply

Dependent variable - Inflation

(i) Using 10 lags on dependent variable and 10 lags of independent variable:

Results of Regression Analysis
Estimate of Constant Term (α): 24.71365
Estimate of Slope Coefficient (β): 6192301
Variance Estimate of Error: 411.2161
Standard Error of Estimate of α: 3364129
Variance of the Estimate of β: 1131737
t-Statistic for β: 1.840685
t-Statistic for α: 73.46224
F-Statistic for the Entire Regression: 3.388119

Results of Correlation Analysis
Coefficient of Determination: 2975135
Correlation Coefficient: 545448
The Calculated t-Statistic for Correlation: 5.206242

(ii) Using 10 lags on dependent variable and 12 lags of independent variable.

Results of Regression Analysis
Estimate of Constant Term (α): 21.94591
Estimate of Slope Coefficient (β): 7534841
Variance Estimate of Error: 313.5074
Standard Error of Estimate of α: 2860727
t-Statistic for β:2.633891
t-Statistic for α: 76.71445
F-Statistic for the Entire Regression: 6.937375

Results of Correlation Analysis
Coefficient of determination: .4644307
Correlation Coefficient: .6814915
The Calculated t-Statistic for Correlation. 7.449765

(iii) Using 10 lags on dependent variable and 14 lags of Independent variable.

Results of Regression Analysis
Estimate of Constant Term (α): 23.57007
Estimate of Slope Coefficient (β): 1.054763
Variance Estimate of Error: 293.372
Standard Error of Estimate of α: .3737898
Variance of the Estimate of β: .1397188
t-Statistic for β: 2.821807
t-Statistic for α: 63.05702
f-Statistic for the Entire Regression: 7.962594

Results of Correlation Analysis
Coefficient of determination: .4988283
Correlation Coefficient: .7062778
The Calculated t-Statistic for Correlation: 7.981274

(iv) Using 10 lags on dependent variable and 16 lags of independent variable.

Results of Regression Analysis
Estimate of Constant Term (α): 42.99706
Estimate of Slope Coefficient (β): .1345115
Variance Estimate of Error: 582.6599
Standard Error of Estimate of α: .6970127
Variance of the Estimate of β: .4858267
t-Statistic for β: .1929829
t-Statistic for α: 61.68763
f-Statistic for the Entire Regression: 3.724245E-02

Results of Correlation Analysis
Coefficient of determination: 4.633734E-03
Correlation Coefficient: 6.807145E-02
The Calculated t-Statistic for Correlation: .5458385

The results of (i) – (iv) are summarised in Table 4.2 below. Similarly the test was carried out using equal lags on the dependent and independent variables, the lags were set at 10, 12, 14 and 16 and the following results were obtained.

(v) Using 12 lags on dependent variable and 12 lags of independent variable.

Results of Regression Analysis
Estimate of Constant Term (α): 6.830275
Estimate of Slope Coefficient (β): .9643196
Variance Estimate of Error: 124.0113
Standard Error of Estimate of α: .1799215
Variance of the Estimate of β: 3.23716E-02
t-Statistic for β: 5.359668
T- Statistic for α: 37.96252
f-Statistic for the Entire Regression: 28.72621

Results of Correlation Analysis
Coefficient of determination: .7821719
Correlation Coefficient: .8844048
The Calculated t-Statistic for correlation: 15.15947

(vi) Using 14 lags on dependent variable and 14 lags of independent variable.
Results of Regression Analysis
Estimate of Constant Term (α): 6.506373
Estimate of Slope Coefficient (β): 1.018302
Variable Estimate of Error: 144.3586
Statistic Error of Estimate of α: .26229041
Variance of the Estimate of β: 6.875099E-02
t-Statistic for β: 3.883625
t-Statistic for α: 24.81415
f-Statistic for the Entire Regression: 15.08261

Results of Correlation Analysis
Coefficient of determination: .6534187
Correlation Coefficient. .8083432
The Calculated t-Statistic for Correlation: 10.98457

(vii) Using 16 lags on dependent variable and 16 lags of independent variable.
Results of Regression Analysis
Estimate of Constant Term (α): 4.371502
Estimate of Slope Coefficient (β): .5810669
Variance Estimate of Error: 68.21505
Standard Error of Estimate of α: 1877204
Variance of the Estimate of β: 3.523894E-02
t-Statistic for β: 3.095385
t-Statistic for α: 23.28731
f-Statistic for the Entire Regression: 9.581451

Results of Correlation Analysis
Coefficient of determination: .544975
Correlation Coefficient: .7382242
The Calculated t-Statistic for Correlation: 8.755091

The results of (v) – (vii) are summarised in Table 4.3

Table 4.2 T-Statistics Results, using 10 lags on dependent variable (inflation) and 10,12,14 and 16 lags of the independent variable.

Null Hypothesis	t_c	$t\alpha$	R	R^2	df	Implication
10 Lags on money SS $a_2L=0$	1.84	1.40*	0.54	0.29	8	MS ➔Inflation
12 Lags on money SS $a_2L=0$	2.63	1.86**	0.68	0.46	8	MS ➔Inflation
14 Lags on money SS $a_2L=0$	2.82	1.86**	0.71	0.49	8	MS ➔Inflation
16 Lags on money SS $a_2L=0$	0.19	1.86	0.068	0.046	8	MS =/=>Inflation

* Significant at 90% confidence level.
** Significant at 95% confidence level.
➔ 'Lead to' (or cause)
=/=> 'Does not lead to'

Table 4.2 reports the results of the t-statistics and correlation analysis: the dependent variable is inflation with 10 lags and the independent variable is money supply with 10, 12, 14 and 16 lags. The t-statistics is significant at 10, 12 and 14 lags at 10% and 5% significant level respectively which indicates that there exist a causal relationship between the money supply and inflation, the direction of causality is from money supply to inflation.

Table 4.3 T-statistic results, using equal lags on the dependent and independent variables, the lags are 12,14 and 16.

Null Hypothesis	t_c	$t\alpha$	R	R^2	df	Implication
12 Lags on money SS $a_2L=0$	5.35	1.86	0.58	0.78	8	MS ➔Inflation
14 Lags on money SS $a_2L=0$	3.88	1.86	0.80	0.65	8	MS ➔Inflation
16 Lags on money SS $a_2L=0$	3.09	1.86	0.73	0.54	8	MS ➔Inflation

Table 4.3 reports the results of the t-statistic and the correlation analysis where the dependent variable is inflation and the independent variable is money supply. Using

equal lags on both variables, i.e. the lags were set at 12, 14 and 16. The results indicate a significant causal relationship between money supply and inflation at 5% level of significant. This shows evidence that a causal relationship exists between money supply and inflation; the direction still being from money supply to inflation.

Thus, the null hypothesis 1, that $a_2L = 0$ is rejected and the alternative $a_2L \neq 0$ is accepted, implying that the growth of money supply does cause inflation. This conclusion tends to support the general view that inflation is largely a monetary phenomenon. In fact, a recent study in the Research Department of thew CBN for the period 1960 to 1994 confirmed that the growth in the money supply is the major determinant of inflation in Nigeria (Ogwuma, 1996: 7).

(b) Testing the Causality between Inflation and Money Supply

The causality between inflation and money supply was also tested, where the money supply was used as the dependent variable and inflation as the independent variable. The following results were obtained:

Regression and Correlation analyses of two variables
Independent Variable: - Inflation
Dependent Variable: - Money Supply

(viii) Using 10 lags on dependent variable and 10 lags of the independent variable.

Results of Regression Analysis
Estimate of Constant Term (α): 11.32156
Estimate of Slope Coefficient (β): .4804572
Variance Estimate of Error: 319.0603
Standard Error of Estimate of α: .261021
Variance of the Estimate of β: 6.813193E-02
t-Statistic for β: 1.840684
t-Statistic for α: 43.37414
f-Statistic for the Entire Regression: 3.388119

Results of Correlation Analysis
Coefficient of determination: .29575135
Correlation Coefficient: .545448
The Calculated t-Statistic for Correlation: 5.206242

(ix) Using 10 lags on dependent variable and 12 lags of the independent variable.

Results of Regression Analysis
Estimate of Constant Term (α): 26.64786
Estimate of Slope Coefficient (β): .1746344
Variance Estimate of Error: 436.8249
Standard Error of Estimate of α: .309664
Variance of the Estimate of β: 9.591183E-02
t-Statistic for β: .5638893
t-Statistic for α: 86.01284
f-Statistic for the Entire Regression: .3179716

Results of Correlation Analysis
Coefficient of determination: 3.822706E-02
Correlation Coefficient: .1955174
The Calculated t-Statistic for Correlation: 1.594921

(x) Using 10 lags on dependent variable and 14 lags of the independent variable.

Results of Regression Analysis
Estimate of Constant Term (α): 24.73278
Estimate of Slope Coefficient (β): .3080381
Variance Estimate of Error: 417.6348
Standard Error of Estimate of α: .3681294
Variance of the Estimate of β: .1355192
t-Statistic for β: .8367659
t-Statistic for α: 67.18503
f-Statistic for the Entire Regression: .7001776

Results of Correlation Analysis
Coefficient of determination: 8.04853E-02
Correlation Coefficient: .2836874
The Calculated t-Statistic for Correlation: 2.366732

(xi) Using 10 lags on dependent variable and 16 lags of the independent variable.

Results of Regression Analysis
Estimate of Constant Term (α): 40.19611
Estimate of Slope Coefficient (β): -.3561837
Variance Estimate of Error: 423. 4888
Standard Error of Estimate of α: 4677269
Variance of the Estimate of β: .2187684
t-Statistic for β: -.7615207
t-Statistic for α: 85.93928
f-Statistic for the Entire Regression: .5799141

Results of Correlation Analysis
Coefficient of determination: 6.758974E-02
Correlation Coefficient: -.2599803
The Calculated t-Statistic for Correlation: -2.153906

The results of (viii) – (xi) is summarised in Table 4.4

Table 4.4 t-Statistics Results, Using 10 lags on the dependent variable (money supply) and 10, 12 14 and 16 lags of the independent variable.

Null Hypothesis	t_c	$t\alpha$	R	R^2	Df	Implicatio
12 Lags on money SS a_3 L=0	1.84	1.40*	0.54	0.30	8	I➔ MS
12 Lags on money SS a_3 L=0	0.56	1.86	0.20	0.038	8	I=/=> MS
12 Lags on money SS a_3 L=0	0.83	1.86	0.28	0.08	8	I=/=> MS
12Lags on money SS a_3 L=0	-0.76	1.86	-0.25	0.07	8	I =/=> MS

* Significant at 90% confidence level.

➔ 'Lead to'

=/=> 'Not lead to'

The estimated results in Table 4.4 indicates a causal relationship between inflation and money supply only with 10 lags. Lags 12, 14 and 16 shows no causal relationship. This results implies that current levels of money supply does not depend on lags levels of inflation.

Furthermore, the t-statistic test was carried out using equal lags on the dependent and independent variables, the lags were set at 10, 12, 14 and 16 and the following results were obtained.

(xii) Using 12 lags on dependent variable and 12 lags of independent variable.
Results of Regression Analysis
Estimate of Constant Term (α): 6.830275
Estimate of Slope Coefficient (β): .9643196
Variance Estimate of Error: 124.0113
Standard Error of Estimate of α: .1799215
Variance of the Estimate of β: 3.23716E-02
t-Statistic for β: 5.359668
t-Statistic for α: 37.96252
f-Statistic for the Entire Regression: 28.72621

Results of Correlation Analysis
Coefficient of determination: .7821719
Correlation Coefficient: .8844048
The Calculated t-Statistic for Correlation: 15.15947

(xiii) Using 14 lags on dependent variable and 14 lags of the independent variable.

Results of Regression Analysis
Estimate of Constant Term (α): 6.592919
Estimate of Slope Coefficient (β): .9920898
Variance Estimate of Error: 126.8868
Standard Error of Estimate of α: 2458252
Variance of the Estimate of β: 6.043002E-02
t-Statistic for β. 4.035753
t-Statistic for α: 26.81954
f-Statistic for the Entire Regression: 16.2873

Result of Correlation Analysis
Coefficient of determination: .6706098
Correlation Coefficient: .8189077
The Calculated t-Statistic for Correlation: 11.41483

(xiv) Using 16 lags on dependent variable and 16 lags of independent variable.

Results of Regression Analysis
Estimate of Constant Term (α): 4.371502
Estimate of Slope Coefficient (β): .5810669
Variance Estimate of Error: 68.21505
Standard Error of Estimate of α: .1877204
Variance of the Estimate of β: 3.523894E-02
t-Statistic for β: 3.095385
t-Statistic for α: 23.28731
f-Statistic for the Entire Regression: 9.581451

Results of Correlation Analysis
Coefficient of determination: .544975
Correlation Coefficient: .7382242
The Calculated t-Statistic for Correlation: 8.755091

The results of (xii) – (xiv) are summarised in table 4.5

Table 4.5 T-Statistic results using equal lags on the dependent and independent variable, the variables were set at 10, 12, 14 and 16 lags.

Null Hypothesis	t_c	$T\alpha$	R	R^2	Df	Implication
12 lags on inflation a_3 L=0	5.35	1.86	0.88	0.78	8	I → MS
14 lags on inflation a_3 L =0	4.04	1.86	0.81	0.67	8	I → MS
16 lags on inflation a_3 L =0	3.10	1.86	0.74	0.54	8	I →MS

The estimate results in Table 4.5, however, indicates a causal relationship between inflation and money supply for all the lags. The correlation analysis has shown a high degree of association for all the lags. This implies that current levels of money supply are to a large extent determined by the existing levels of inflation. In other words, inflation leads to increase in money supply especially at equal time lags. The direction of causality here is, therefore, from inflation to money supply. Hence the null hypothesis II, that variation in inflation does not cause changes in money supply $a_3L = 0$ is rejected and the alternative that $a_3L \neq 0$ is accepted.

Thus, Table 4.2 and 4.3 shows evidence of a causal relationship from money supply to inflation while Table 4.5 indicates that there exist a causal relation between inflation and money supply, the direction of causation being from inflation to money supply. Hence, we can say that there is a bi-directional relationship between money supply and inflation in Nigeria for the period 1980-1995.

4.3 Estimating the Impact of the Causality Between Money Supply and Inflation on the Gross Domestic Product (GDP)

In order to estimate the actual impact of effect of inflation on GDP, we use equation (11) and (12) presented above. In other words, we apply a two-stage Least Square estimate as specified by the structural equations (11) and (12). The line of estimation is from money supply to inflation and then to the Gross Domestic Product (GDP). The process and results of this estimation is presented below.

Table 4.6 Application of Two-stage Least-Square to three variables: Money Supply, Inflation and Gross Domestic Product (GDP) .

(a) Stage 1: Money Supply (x) and Inflation (Y)

MS	I	$MS - \overline{MS} = m$	$I - \bar{I} = (i)$	mi	m^2
10.3	74.3	-15.14	39.4	-596.52	229.22
39.1	57.0	13.66	22.1	301.89	186.60
52.8	57.2	27.36	22.3	610.13	748.57
66.4	70.1	40.96	35.2	1441.79	1677.72
32.7	52.7	7.26	17.8	129.23	52.71
44.89	45.6	19.45	10.7	208.12	378.30
21.5	40.9	-394	6.0	-23.64	15.52
43.6	38.2	18.16	3.3	59.93	329.79
15.7	10.2	-9.74	-24.7	240.58	94.87
3.2	5.4	-22.24	-29.5	656.08	494.62
8.7	5.5	-16.74	-29.4	492.16	280.23
18.6	39.6	-6.84	4.7	-32.15	46.79
12.3	23.2	-13.14	-11.7	153.74	172.66
3.5	7.7	-21.94	-27.2	596.77	481.36
19.3	20.9	-6.14	-14.0	85.96	37.0
14.4	9.9	-11.04	-25.0	264.96	121.88
$\Sigma MS = 406.99$	$\Sigma I = 558.4$			$\Sigma mi =$ 4589.03	$\Sigma m^2 =$ 5348.54
$\overline{MS} = 25.44$	$\bar{I} = 34.9$				

$$b_1 = \frac{\Sigma mi}{\Sigma m^2} = \frac{4589.03}{5348.54} = 0.857996761$$

$$\alpha_1 = \bar{I} - b_1\overline{MS} = 34.9 - (0.86)(25.44) = 13.0216$$

The estimated line showing the relationship between money supply and inflation in the first stage is

$$\hat{I} = 13.02 + 0.86MS \quad \ldots\ldots\ldots\ldots\ldots\ldots(17)$$

Where $\hat{I}$ = Inflation (estimated)

MS = Money supply.

Equation (17) was used to estimate the values of inflation ($\hat{I}$). Then the growth rate of GDP was regressed on this estimated values of inflation. This is done in order to show the impact of inflation (due to money supply) on the growth rate of the Gross Domestic Product (GDP). Equations 12, 14 and 16 as provided above were applied here.

The process and results is as shown below.

Table 4.6B

(b) Stage 2: Inflation (I) and Gross Domestic Product (GDP) (GR)

Inflation ($\hat{I}$)	GDP (GR)	$\hat{I} - \bar{\hat{I}} = i$	$\overline{GR\text{-}GR} = gr$	i^2	igr	$\hat{GR}$	$GR - \hat{GR}$	$GR - \hat{GR})^2 = SSe$
21.88	2.20	-13.02	0.91	169.52	-11.85	37.57	-15.69	246.18
46.65	1.00	11.75	-0.29	138.06	-3.4	40.79	5.86	34.34
58.43	2.30	23.53	1.01	553.66	23.77	42.33	16.10	259.21
70.1	4.12	35.20	2.83	1239.05	99.62	43.84	26.26	689.59
41.41	4.63	6.24	3.34	38.74	20.84	40.09	1.05	1.10
51.63	8.20	16.73	6.91	279.89	115.60	41.44	10.19	103.84
31.51	7.39	-3.39	6.10	11.49	-20.68	38.83	-7.68	58.98
50.52	9.91	15.62	8.62	243.98	134.64	41.30	9.22	85.01
26.52	-0.41	-8.38	-1.70	70.22	14.25	38.18	-11.66	135.96
51.77	3.13	-19.13	1.84	365.96	-35.20	36.78	-21.01	441.42
20.50	9.38	-14.4	8.09	207.36	-116.50	37.40	-16.90	285.61
29.02	4.33	-5.88	3.04	34.57	-17.88	38.50	-9.48	89.87
23.60	-13.92	-11.33	-15.21	127.69	171.87	37.81	-14.21	201.22
16.03	-0.34	-18.87	-1.63	356.08	30.76	36.82	-20.79	432.22
29.62	26.81	-5.28	-28.1	27.88	148.37	38.59	-8.97	80.46
25.40	5.48	-9.50	4.19	90.25	-39.81	38.04	-12.64	159.77
$\Sigma\hat{I}$ = 558.32 $\bar{\hat{I}}$ =34.9	ΣGR = 20.59 $\overline{GR}$ =1.29			Σi^2 = 3954.39	Σigr =514.39			SSe =3304.78

$$b_2 = \frac{\Sigma igr}{\Sigma i^2}$$

$$\alpha_2 = \bar{\hat{I}} - (b_2)(\overline{GR}) = 34.9 - (0.13)(1.29) = 34.73$$

The linear relationship between inflation and real growth rate of GDP is shown by the equation (18)

$$\hat{GR} = 34.73 + 0.13\,\bar{\hat{I}}$$

Where.

GR = Growth rate of Real GDP (estimated)

$\hat{I}$ = Induced inflation (i.e. inflation due to money supply).

To prove hypothesis III that variation in the rate of inflation has no positive significant effect on the growth rate of rate GDP ($b_2 = 0$), we test the statistical significant of $b_2$using the t-statistic as denoted by equation (1) in Chapter 1. Thus

$$S^2 = \frac{SSe}{n-2} = \frac{3304.78}{16-2} = 236.06$$

$$Se = \sqrt{S^2} = \sqrt{236.06} = 15.36$$

$$t_c = \frac{b_2}{Se/\sqrt{\Sigma i^2}} = \frac{0.13}{13.15/\sqrt{3954.39}} = \frac{0.13}{(15.3/62.88)} \approx \frac{0.13}{0.24} = 0.54$$

$t\alpha$ at 95% confidence level = 1.86. Since critical tabular value of t-statistic is greater than t_c as calculated by the available data, we accept the null hypothesis III, that the variation in inflation does not significantly contribute to the positive growth rate in real GDP. This goes to confirm the emerging consensus that high inflation tends to engender low economic growth. For instance, a study by the world bank in 1995 showed a close relationship between rising inflation and diminishing growth rates across a variety of inflation ranges (Bullion, 1996:4). The negative influence of inflation on economic growth was traced to its effects on both aggregate demand and supply in the economy. Inflation by reducing consumers purchasing power, leads to a fall in the growth of aggregate demand which increases in business inventories and further reduction in production. On the supply side, inflation increases the cost of the factors of production (capital, labour, raw materials, etc) and leads to uncertainty in business planning. These factors constrain investment which is critical to economic growth trend in Nigeria during the period could be linked to high inflationary pressures.

The coefficients of elasticities for equations (17) and (18) are 0.86 and 0.13 respectively. This shows that a 100 percent increase in money supply will induce inflation by 86 percent which will in turn affect the Gross Domestic Product (GDP) by a mere positive 13 percent, implying that high inflationary trends are inimical to economic growth.

The results of the test in Chapter Four shows that there is a significant causal relationship between the money supply and inflation. The direction of the causality appears to be bi-directional i.e. from the money supply to inflation with a feedback.

Also in order to show the impact of this causal relation between the money supply and inflation on the growth of real GDP, a two stage-least square method of estimation was applied to the system of simultaneous equations specified in Chapter Four. The results presented in Table 4.6A and 4.6B for the first and second stages indicated no significant positive impact on the growth rate of real GDP and this confirms the emerging consensus that high inflation tends to engender low economic growth.

The results have important implications at a macro-economic level; that whereas money supply could be considered as an explanatory variable for inflation, it could as well serve as a dependent variable on inflation. So that while building a macro-economic model for Nigeria economy note should be taken that the money supply and inflation could be jointly determined. The results also show that the causal relationship between money supply and inflation runs in both directions. The puzzle of previous studies that causality is found only in one direction from money supply to inflation but not the reverse could be a mere statistical fluke arising from the lack of a relevant econometric tool. Moreover the results further suggest that policy makers in Nigeria could exploit the causal relationship between money supply and inflation to engender the movement in the growth rate of the Gross Domestic Product.

5.2 Recommendations

Arising from the four chapters in this thesis the following recommendations are made:

First, whereas a close relationship between the money supply and inflation is indicated for Nigeria, monetary expansion does not appear to have significant positive impact on real output growth. This implies the possibility of reducing inflation via monetary restraint without significantly affecting real output growth. However, a note of caution is in order. In Nigeria (as in many developing countries), monetary policy is not autonomous in the broad sense but is the means of financing budget deficits. Hence, while rising government outlays may only have marginal impact on the growth of real output (and perhaps only compensating for falling demand for exports), a reduction in such outlays – a necessary precondition for lower money growth – may well affect real output in a negative way. So, for the purpose of ensuring a more effective monetary management in this regard, the monetary authorities should be allowed greater discretion in the manipulation of various policy instruments especially those with respect to money supply, inflation and the growth rate of real output.

Secondly, government policy aim at controlling inflation should aim first at checking its own spending for the effective control of money supply and secondly should take cognisance of the existence of a bi-directional relation between this variables. In addition, the existence of non-monetary factors to inflation should be restrained so as not to trigger inflation in the system. This is because once inflation is triggered by non-monetary factors, then it will in turn motivate supply.

Thirdly, in order to achieve a sustained price stability with growth, we need to be fiscally prudent and the various expenditure programmes of government needs to be properly phase and coordinated. In addition, supply side initiatives and incentives are needed to enhance productivity and output.

Fourthly, it has been noted that remedial measures taken in the past to tackle the problem of inflation in Nigeria were centred on price controls and quantity rationing,

restrictive monetary and fiscal policies, quantitative controls (quotas and tariffs) and institutional reforms. But hence the problem still persist, there is every need to take measures that will boost national output. Towards this end, supply bottlenecks hampering increased production in the agricultural and industrial sectors should be addressed. Also there is the need to overhaul and rehabilitate the nations infrastructural facilities (such as roads, water, power and telecommunication apparatus) with a view to reducing costs of production and distribution. Monetary policy aimed at demand management must be well co-ordinated with the government fiscal measures so as to reduce areas of conflicts and the persistent fiscal deficits with its attendant adverse effects on money supply and inflation. Exchange and interest rate policies should be rationalised so as to achieve price stability.

Finally, removal of subsidy on productive inputs (fertilizers, petroleum products, etc) should be done cautiously to ensure that gains made from other remedial policy measures are not eroded by the high inflationary tendencies that are triggered by such removal.

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