EXCHANGE RATE VARIATION AND INFLATION IN NIGERIA (1970-2007)

Master Degree Project in Economics and Finance
D-Level 15 ECTS
Spring term Year 2008

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Examiner: Max Zamanian (PhD)
ABSTRACT

This study examines the impact of exchange rate on inflation in Nigeria economy between 1970 and 2007. We analysed the trend of inflation and exchange rate in the last 38 years by evaluating the relationship between government expenditure, money supply, Oil revenue, exchange rate and inflation as the dependent variables. We adopted the Augmented Dickey-Fuller to carry out the unit root test and cointegration with Johansen test.

Our result shows that the individual variables are integrated order one, that is a unit root exist. This means that each variable tends to follow a random walk. On the other hand, inflation rate, exchange rate, oil revenue, government spending and money supply are cointegrated. This revealed a strong relationship among the variables though inflation rate and exchange rate show no long term relationship, but short term relationship seems to exist between them.
Acknowledgements

We would like to express our gratitude to all those who gave us the possibility to complete this thesis. We want to thank the Department of Financial Economics for giving our opportunity to commence this program and the thesis in the first instance, to do the necessary research work.

We are deeply indebted to my supervisor Bernd-Joachim Schuller (PhD) whose advice, stimulating suggestions and encouragement helped ours in all the time of research for and writing of this thesis.

We thank almighty God, for sustaining us during the program, furthermore thanks to and all our lecturers, especially Hans Mörner and Max Zamanian (PhD) whose role as lecturers gave us enduring foundation.

Finally thanks to our family members.
TABLE OF CONTENTS

Abstract---------------------------------------------------------------1
Acknowledgements------------------------------------------------------2
Table of content-------------------------------------------------------3

CHAPTER ONE: INTRODUCTION

1.1 Introduction--------------------------------------------------------5
1.2 Statement Problem-----------------------------------------------7
1.3 Objective of Study------------------------------------------------8
1.4 Justification of Study--------------------------------------------8
1.5 Study Methodology-----------------------------------------------9
1.6 Scope of the study----------------------------------------------9
1.7 Plan of Study------------------------------------------------------9
1.8 Type and Sources of Data---------------------------------------9

CHAPTER TWO: The Foreign Exchange Market in Nigeria

2.1 Foreign Exchange Market Evolution-------------------------------10
2.2 The Exchange rate Channel of Monetary Policy----------------11
2.3 Exchange Policy in Nigeria--------------------------------------13

CHAPTER THREE: Literature Review

3.1 Exchange Rate------------------------------------------------------17
3.2 Money Supply Mechanism----------------------------------------24
3.3 Government Expenditure----------------------------------------26
3.4 Theories of Inflation-----------------------------------------28
3.5 Review of Empirical Studies-----------------------------33
3.6 Phenomenon of the Dutch Disease Model-----------------38

CHAPTER FOUR:
4.1 Model and Empirical Estimation--------------------------40
4.2 Presentation of the Model-------------------------------40
4.3 Interpretation of Result------------------------------42

CHAPTER FIVE:
Conclusion------------------------------------------------47
Bibliography---------------------------------------------48

TABLE:
2.1 Annual Data-----------------------------------------12
4.1 ADF Test------------------------------------------41
4.2 Co-integration on the Five Variables-----------------43
4.3 Co-integration, Inflation and Exchange Rate----------44
4.4 Co-integration, Inflation and Money Supply-----------44
4.5 Co-integration, Inflation and Government Expenditure--44
4.6 Co-integration, Inflation and Oil Revenue------------45

DIAGRAM:
Demand Shift--------------------------------------------18
Supply Shift---------------------------------------------18
CHAPTER ONE

1.1 INTRODUCTION
WHAT IS INFLATION?
Inflation is one of the most frequently used terms in economic discussions, yet the concept is variously misconstrued. There are various schools of thought on inflation, but there is a consensus among economists that inflation is a continuous rise in the prices. Simply put, inflation depicts an economist situation where there is a general rise in prices of goods and services, continuously. It could be defined as ‘a continue rise in prices as measured by an index such as the consumer price index (CPI) or by the implicit price deflator for Gross National Product (GNP). Inflation is frequently described as a state where “too much money is chasing too few goods”. When there is inflation, the currency losses purchasing power. The purchasing power of a given amount of naira (currency) will be smaller over time when there is inflation in the economy. For instance, assuming N10.00 (Nigeria unit currency) can purchase 10 shirts in the current period, if the price of shirts double in the next period, the same N10.00 can only afford 5 shirts.

In the definition of inflation, two key words must be borne in mind. First, is aggregate or general, which implies the rise in prices that constitutes inflation must cover the entire basket of goods in the economy as distinct from an isolated rise in the prices of a single commodity or group of commodities? The implication here is that changes in the individual prices or any combination of the prices cannot be considered as the occurrence of inflation. However, a situation may arise such that a change in an individual price could cause the other prices to rise. An example is petroleum product prices in Nigeria. This again does not signal inflation unless the price adjustment in the basket is such that the aggregate price level is induced to rise. Second, the rise in the aggregate level of price must be continuous for inflation to be said to have occurred.

Broadly, inflation can be grouped into four types, according to its magnitude:
1. **Creeping inflation:** This occurs when the rise in price is very slow, a sustained annual rise in price of less than 3% per annum falls under this category. Such an increase in prices is regarded safe and essential for economic growth.

2. **Walking Inflation:** Occurs when prices rise moderately and annual rate is a single digit. It has a range of between 3% and less than 10%. Inflation of this kind is a warning signal for government or policy
makers to control it before it turns into running inflation.

3. **Running Inflation:** When prices rise rapidly at the rate of between 10 percent and 20 percent per annum, it is called running inflation. The middle class and the poor feel the bite. Only strong monetary and fiscal measures can control such inflation. This is where the Nigeria economy finds herself in the last two and half decades which to this moment is still an issue in the economy.

4. **Hyper Inflation:** When prices double or triple in digit rates, that could result in a situation where inflation rate can no longer be measured or controlled. Prices could rise many times everyday. For instance, the current Zimbabwe inflation rate is at 37131.9%. Basically, two identified causes are Demand pull and Cost push inflation. This would be discussed in later chapters.

**Inflation generally is a worldwide phenomenon; it is not peculiar to Nigeria only.**

The major four factor that have been identified as the causes of inflation in Nigeria are the money supply, nature of government spending, exchange rate, price of energy product and the oil revenue hence the wealth of the country depend largely on the oil price.

**Why is inflation a must fight issue with central bank?**

Central banks world over are obsessed about inflation and therefore, devote a significant amount of resources at their disposal. Hence, the primary objective of monetary policy is to ensure price stability. The focus by central bank of Nigeria (CBN) on price stability derived from the overwhelming empirical evidence that it is only in the midst of price stability that sustainable growth can be achieved.

Price stability does not connote constant price level, but it simply means that the rate of change of the general price level is such that economic agents do not worry about it. Inflationary conditions imply that general price level keeps increasing over time. To appreciate the need for policy makers (CBN) to fight inflation, it’s imperative to understand the implications of frequent price increase in the system. Such implications are:

1. Discouragement of long term planning
2. Reduction of savings and capital accumulation
3. Reduction of investment
4. Shift in the distribution of real income and consequent misallocation of resources and
5. Creating uncertainty and distortions in the economy. These are what the Central bank of Nigeria must guard against to achieved a stable economy and devour of inflation and exchange rate fluctuations.

**HOW DOES INFLATION AFFECT THE ORDINARY MAN IN NIGERIA?**

Inflation affects different people or economic agents differently. Broadly, there are two economic groups in every society, the fixed income and the flexible income group. During inflation, those in the first group lose while those in the second gain. This is because the price movement of different goods and services are not uniform. During inflation, most prices rise, but the rates of increase of individual prices differ. Prices of some goods and services rise faster than others while some may remain unchanged. As mentioned before the poor and the middle class suffer because their wages and salaries are more or less fixed but the prices of commodities continue to rise. On the other hand, businessmen, Industrialist, traders, real estate holder’s speculators and others with variable incomes gain during rising. This will be discussed in detail in the literature review. The major objective of macro economic policy is to create a stable economy that would maintain and achieve an acceptable level of employment, good utilization of available resources, a good balance of payment, sustainable growth in economic and relatively price stability.

The price stability level has a greater impact on average individual standard of living. Nigeria has experience severe inflationary economy since 1970 till date. Several measures have been taken to against the worst form of inflation and exchange rate fluctuations that had characterized the Nigeria economy for more the three decades.

**1.2 STATEMENT OF PROBLEM**

Nigeria has experienced continuous rise in the prices of goods and services in the mid 1970s due to fixed exchange rate policy introduced. It was worst during the period surrounding exchange rate deregulation policy in the mid 1980s. Inflation in the 1970s was due to civil war, salary awards (Ndogwi award) and excess government spending. Although, Nigerian’s economy generated a lot of revenue from oil boom it goes along way to cater for its increased expenditure. Inflation in the mid 1990s became terrible due to sanction on Nigeria by international community. Inflation rate has been reduced due to policy maker adoption of deregulation and privatization policy in mid 2000s while Exchange rate as well reduced from double digit to a single digit due to adoption of Dutch Auction system (DAS) introduced
in 2002. There are various studies on the subject matter. Elbadawi (1990) concludes that devaluation of the official exchange rate is not inflationary; he further stated that prices have adjusted to the parallel exchange rate. Greene and Canetti (1991) in their study on ten Africa countries arrived at the conclusion that exchange rate movement explains the inflationary change. Moser (1994) found that monetary expansion driven mainly by expansionary fiscal policies, and devaluation of the naira as well as agro-climatic conditions, explains the inflationary process in Nigeria. The different views held by these schools of thought mentioned above as to what obtainable in the Nigeria economy brought some certain questions:

- What is the completely accurate impact of the exchange rate on inflation in Nigeria?
- What is the relationship between government expenditure, money supply, exchange rate and inflation in Nigeria?

This study will attempt to answer these questions and find out empirically through economic modelling, the relationship between exchange rate management and inflation in Nigeria.

1.3 OBJECTIVE OF STUDY
This study will be guided by the following objectives:
(a) To find out the impact of exchange rate on the current rate of inflation in the economy.
(b) To show the relationship among money supply, revenue from oil, inflation, government expenditure and exchange rate in Nigeria.
(c) To come up with suitable suggestions that can assist future policy making in Nigeria.

1.4 JUSTIFICATION OF STUDY
Central banks the worlds over are obsessed about inflation and, therefore, devote a significant amount of resources at their disposal to fight inflation. Hence, the primary reasons are because of its adverse consequences on individuals and the economy as a whole. The effects of inflation include continuous erosion of the purchasing power of money, inequitable distribution of income among earners, loss of social welfare due to price increases and reduction in savings and investments.

The justification of the study is that it intends to answer certain questions such as, what are the causes of inflation in Nigeria, and how can it be related to exchange rate, money supply and government expenditure.

This answer will form the basis upon which suggestions will be made as to how inflation can be reduced or eliminated totally or to the
minimum level.

1.5 STUDY METHODOLOGY
This study will adopt the unit root test (Augmented Dickey Fuller) as well as Johansen co-integration test. The null hypothesis is accepted if unit root exists ($H_0 = \beta = 0$) otherwise the alternative hypothesis is accepted ($H_a = \beta < 0$). While the null hypothesis for co-integration is accepted if ($H_a = \Pi = 0$) otherwise rejected if ($H_0 = \Pi < 0$) i.e. co-integration exist. The data for the study is based on annual data from 1970 – 2007, CBN and financial institutions sources.

1.6 SCOPE OF THE STUDY
This study will cover a period of 38 years (1970 - 2007) for a detail analysis of the work. In the cause of this study emphasis shall be on central government spending, the narrower definition of money supply (MSI) shall be adopted. For example, Money supply could be defined as the total sum of money in any currency of a country held by commercial banks and other financial institutions. However, government spending, exchange rate, low productivity, corruption, money supply and revenue from oil are some known factors of inflation in Nigeria.

1.7 PLAN OF STUDY
The study will be in four chapters with each being subdivided with respect to it concerns.
Chapter one contains the introduction; the problem statement, objectives of the study, the justification of the study, methodology and analysis, scope of the study, plan of study as well as data type and sources of data.
Chapter two focuses on the background of the study, while three constitutes the literature review.
Chapter four comprises of the empirical chapter. It comprises interpretation of results, the summary and conclusion.

TYPE AND SOURCES OF DATA
This study has made use of secondary data analysis and they are:
(1) Economic and financial review on various issues Central Bank of Nigeria [CBN]
(2) Various volumes of statistical bulletin from Central Bank Nigeria
(3) Annual report on various issues by Central Bank of Nigeria (CBN)
(4) The Federal Office of Statistic (FOS)
(5) Economic and Business Review [published by Business Times, Lagos.]
(6) Information from various Issues by International Financial Statistical (IFS)
CHAPTER TWO

THE FOREIGN EXCHANGE MARKET IN NIGERIA

2.1 FOREIGN EXCHANGE EVOLUTION
The evolution of the foreign exchange market in Nigeria was influenced by a number of factors such as the changing pattern of the international trade, institutional changes in the economy and structural shifts in production. Before the establishment of the Central Bank of Nigeria (CBN) in 1958 and the enactment of the Exchange Control Act 1962, foreign exchange was earned by private sectors and held in the balances aboard (outside Nigeria) by commercial banks which acted as agents for local exporters. During this period, agriculture export contributed the bulk of foreign exchange receipts. Then the currency was Nigerian pound which was tied to the British pound sterling her colonial master at par, with easy convertibility, delayed the development of active foreign exchange market. However the establishment of central Bank of Nigeria (CBN) and the subsequent centralization of foreign exchange authorities in the bank, the need to develop a local foreign market became paramount. The increased export of crude oil in the early 1970s, following the sharp rise in it prices enhanced official foreign exchange receipts. The foreign exchange market experienced a boom during this period and the management of foreign exchange became necessary to ensure that shortage did not arise. However it was not until 1982 that comprehensive exchange controls were applied as a result of the foreign exchange that set in that year. The increasing demand for foreign exchange at the time when the supply was shrinking encourages the development of a flourishing parallel market of foreign exchange. The exchange controls was unable to evolve an appropriate mechanism for foreign exchange allocation in consonance with the goal of internal balance. This led to introduction of second tier Foreign Exchange Market (SFEM) in September 1986. Under SFEM, the determination of the Naira exchange rate and allocation of foreign exchange were based on market forces. To enlarge the scope of Foreign Exchange Market, Bureaux de Change was introduced in 1989 for dealing in privately sourced foreign exchange. As result of volatility in rates, further reforms were introduced in the Foreign Exchange Market in 1994. These included the formal pegging of the Naira exchange rate, the centralization of foreign exchange in the CBN, the restriction of Bureaux de Change to buy foreign exchange as agents of the CBN, the reaffirmation of the illegality of the parallel market and the discontinuation of open account
and bills for collection as means of payments sectors. The Foreign Exchange Market was liberalized in 1995 with the introduction of an Autonomous Foreign Exchange Market (AFEM) for the sale of foreign exchange to end-users by the CBN through authorized dealers at the market determined exchange rate. In addition, Bureaux de Change again accorded the status of authorized buyers and sellers of foreign exchange. The Foreign Exchange was further liberalized in October, 1999 with the introduction of the Inter-bank Foreign Exchange (IFEM).

Recently, the Wholesale Dutch Auction System, (WDAS) was introduced on February 20, 2006 as an improved framework for determining the exchange rate in foreign exchange market. Under the arrangement, the CBN remains active market participation and the dealing is based on the two-way quote. The adoption of WDAS was to consolidate the gains of the retail DAS, further liberalize the foreign exchange market to enhance its depth, and achieve convergence in rates between the official and other segments of the market.

Other complement policy measures that were introduced are:

- Special foreign exchange auction offered to deposit to Deposit Money Bank (DMB)
- Direct sales of foreign exchange to licensed Bureaux De Change (BDC) operators.
- The Foreign Exchange Manual, which guides the operators of the all stakeholders in the Foreign Exchange Market, was also reviewed to accommodate all the transaction that was liberalized during the year.

### 2.2 THE EXCHANGE RATE CHANNEL OF MONETARY POLICY TRANSMISSION

The central bank use monetary policy to achieve the goals of macroeconomic management. Consequently, monetary policy is employed as a tool to control and influence monetary aggregates such as interest rate, money supply and bank credit, including the exchange rate, with a view to achieving set policy targets such as tackling unemployment inflation economic growth etc. In this regard, monetary policy plays an important role towards achieving the ultimate economic objectives of sustainable growths, full employment, price stability and a healthy balance of payments.

The pursuit of these goals, the central bank of Nigeria sets intermediate objectives for monetary policy. These are goals which relate to using interest rates, growth in the money supply and the exchange rate to achieve the ultimate goals of monetary management. In other words, the intermediate goals are regarded as channels through which monetary policy is transmitted to the macro economy.
with the aim of impacting on ultimate objective. The exchange rate is one of the intermediate policy variables through which monetary policy is transmitted to the larger economy through its impact on the value of domestic currency, domestic inflation (the pass through effect), the external sector, macroeconomic credibility, capital flows, and monetary and financial stability. Thus exchange rate might induce changes in relative prices of goods and services, and the level of spending by individuals and firms, especially if significant levels of their wealth are held in foreign currencies. An appreciation in the value of an exchange rate rise makes imported goods and services relatively cheap, while depreciation makes export become cheaper to foreign buyers, thereby inducing higher competition in export markets at home.

On the other hand, with depreciation, imports become more expensive and so less competitive against goods produced by domestic producers. Changes in the exchange rate therefore, have implications for individual spending and investments behaviour of firms, all of which can affect aggregate demand (an important determinant of economic growth, price stability and full employment in the macro economy) However, there is a growing debate among monetary economists: whether in the current medium term orientation of monetary policy, the exchange rate is still significant as a transmission channel for monetary policy.

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Source: Central Bank of Nigeria Statistical bulletin.

### 2.3 EXCHANGE RATE POLICY IN NIGERIA

From chapter one it was made known how Nigeria experienced sever inflation bite for a long period of time, this of course calls for the stability of prices as a concern by the makers of policy. As such several economic policies were adopted by the Government with various reforms activities E.g. second-tier Foreign Exchange Market, Structural Adjustment Programme (SAP) 1986. then bureaux de change were introduction in 1989 for privately sourced foreign exchange, the reforms got a boost when the Foreign Exchange Market was liberalized in 1995, the introduction of an Autonomous Foreign Exchange Market. (AFEM) with this new arrangement end users would have access to foreign exchange. These innovative and reform approaches are targeted at repositioning and stabilizing the economy. Although little were achieved in many cases this is as a result of non
compliance with the reforms in details causing more hindrance to
economy growth. Unemployment, cost of living, economic dependence
or over reliance on importation with perennial deficit in terms of
balance of trade.
Inflationary economy like ours between 1960 and 1970 was on the
arrange of 4.96 percent when measured by consumer price index
(CPI), the period between 1960 and 1970 witnessed civil war which
further crippled economic activities and subsequent injection of funds
for reconstruction after the civil war.

Government expenditure increase with the boom experience from
crude oil export, gave rise to increase in inflation from 1970 to 13.8
per cent. The boom experienced in the crude oil export shifted
attention from agriculture that has sustained the economy to crude oil
export, with limited agricultural produce, there by creating scarce
situation and encouraging importation, help increase instability in both
exchange rate and inflation. The period between 1970 and 1980
witnessed an average inflation of 13.7 percent. Also, this period
experienced more government spending in transition programme to a
new government. Volatility of the exchange rate and inflation increases
which means the trend to have running and hyper inflation was long a
question. Already the percent increase from the last decade is 176
percent, constantly kept a rising trend.

Inflation in the 80s continues rising till 1986 when measures were
taken to deregulate exchange rate, to solve the inflation problem, this
in return devalued Naira hastily. Government placed ban on foreign
goods except (machinery for industrial use and agro- chemicals) in
order to increase local production. The value of Naira was another
concern to the government that once argues about the Naira being
overvalued, the fixed exchange rate regime induced an overvaluation
of the naira and was supported by exchange control regulations that
engendered significant distortions in the economy.

That gave vent to massive importation of finished goods with the
adverse consequences for domestic production, balance of payments
position and the nation’s external reserves level. Moreover the period
was bedevilled by sharp practices perpetrated by dealers and end-
users of foreign exchange. These and many other problems informed
the adoption of a more flexible exchange rate regime in the context of
SAP, adopted in 1986. Naira took a characteristic toward devaluation,
exchange rate became more vulnerable to inflationary threat, detail on
table 2.1 one could easily deduce the how Naira continued to
depreciate, as a result of rate of inflation which co vary positively.
Also, the period between 1990 and 2000 witnessed an average of 30.59 per cent. Inflation rate was very low in both 1990 and 1991. These were 7.5 and 13 per cent respectively. It rose up again in 1992, 1993, 1994 and 1995 respectively. This can be largely attributed to the international sanction at that particular period of time. While exchange rate at time, also rose from one digit in 1991 to double digit at the subsequent years. Inflation rate was very low in 1999 and 2000; this can be largely attributed to the democratic government elected in 1999. The government that came in 1999 had tried to adopt various policies to engineered economy growth such as, Privatisation, Recapitalisation of commercial banks (to put Nigerian banks in the mean centre of creating investment opportunity for the economy), and so on. Although with all the policy maker effort, inflation rose to double digit from 2001 to 2006, this can be largely attributed to government deficit, growth in money supply, increase in exchange rate, etc. From the table above, rise in inflation rates from 1970 could be seen as a result the nature of government expenditure, exchange rate, money supply, revenue from oil and production activity. Worthy of mention is the fact that government deficit has become a significant features of the government fiscal policy in the Nigerian economy. It should be noted that agricultural sector suffered some neglect during the civil war. There were huge shift of labour to the armed forces, the size which increased substantially without stressing compulsory enlistment. Also in the 1970s there was rural-urban migration maybe for economic and social reasons. This incident led to very healthy and able bodied percentage deserting agricultural labour force. Also, production gains from agriculture were very poor because of low capital substitution and limited use of fertilizers to improve the quality of the soil. Industrial expansion was constraint by the restrictive import policy adopted by the government. This resulted in excess demand for many consumer goods and services which later led to high prices in the economy. This was recorded in 1970-1979.

Money supply has expanded rapidly during the 1986 till date, with the exception of 1986 and 1995. With a negative growth of 1.2 per cent in 1986, the money supply rise tremendously in 1988 by 4.1 per cent. It also fell in 1995 to 21.5 per cent. Supply of money has been fluctuating upwards from 1993 to 2007. The CBN is largely responsible for financing government fiscal deficit during this period. The trend in the growth of money supply and inflation in Nigeria tends to buttress the general view that inflation is largely a monetary phenomenon. In fact, a recent research in the department of CBN from 1960 to 1994, confirmed that growth in money supply is the major determinant of inflation in Nigeria. Inflation rate rose declined from 40.9 per cent in
1989 to 7.5 per cent in 1990 due to contraction fiscal policies adopted in 1989. With a declined in monetary growth in 1995, the inflation rate rose again to 72.6 per cent in 1995, then declined to about 43.3 per cent in 1996. It should be noted that inflation and money supply have a strong relationship but other factors such as government deficit, exchange rate, capacity utilization rate, rainfall etc, do influence inflationary pressures.

There are no doubts that inflation has a negative impact on the economy growth such as GDP. For instance, a research by World Bank in 1995 showed that a close relationship exist between rising inflation and diminishing growth rate of economies across a variety if inflation changes. There are strong indications that the observed growth trend in Nigeria during the period could be attributed to high inflationary pressures.

Government expenditure has been on an increased from 1970 to 2007 with exception in some years. This led to double digits growth rates in money supply between 1970 and 1979 which eventually led to inflation. It is known today that most Africa countries face a problem of deficit. Nigeria with no exception, government deficit became prevalent features of fiscal operation with some exception in some years. The other factor that led to the double-digit inflation rate in the review period is imported inflation. Naira which is a currency note for Nigeria has been fluctuating upward. The fluctuation in the exchange rate has a negative impact on the inflation rate. The fluctuation in the values of the currencies of Nigeria's trading partners resulted in higher prices of imports from these countries.

It should be noted that liquidity effects whereby changes in foreign reserves occasioned by balance of payment outcomes affect the money supply. Nigeria is highly dependent on foreign goods; this led to a large volume of import which later resulted into inflation. The shortage of industrial production can be attributed to continuous depreciation of Naira most especially in 1986. With the introduction of Structural adjustment programme (SAP) in 1986, Naira was depreciated. The parallel market exchange rate permitted wide fluctuation in the exchange rate and it did have significant effect on price formation at that particular period. Also oil revenue has been increasing most especially during the gulf war in 1991. The fluctuation in oil revenue led to fluctuation in money supply. With the wind fall from oil revenue, the Nigeria still face high level of government deficit because of huge expenditure pattern. For references, from the table above, it should be noted that high inflation rate corresponds with high money supply and high government expenditure.
Chapter 3

LITERATURE REVIEW

3.1 EXCHANGE RATE:

Meaning and Determination of exchange rates
An exchange rate is a price - exactly the same as any other price the amount you have to give up to acquire something else - in this case another currency. So an exchange rate is the price of one currency in terms of another. In other words it is the price you will pay in one currency to get hold of another. The price can be set in various ways. It may be fixed by the government or it could perhaps be linked to something external - for example, gold. However, the most likely alternative is that it will be fixed in a market. Since it is a price, it will be determined, like any other price, by demand and supply. This is the supply and demand of Naira traded on the foreign exchange market and is not the amount of Naira in circulation! A high level of demand for a currency will force up its price - the exchange rate. Where supply is equal to demand is the equilibrium exchange rate.

The demand for Naira comes from people who are investing in the Nigeria from abroad and so need Naira, or from firms who are buying local products. They will need naira to be able to pay for the goods. The supply comes from people in the Nigeria who are selling Naira. This may be because they have bought goods from overseas (imports), or it may simply be that they are investing in another country and so need the local currency. To get this they have to sell Naira in exchange for the other currency.

The equilibrium rate is where supply is equal to demand, and this will change as supply and demand changes. Say, for example, that interest rates increase. This will tend to attract more overseas investment into Nigeria. To invest here, they will need to buy local currency, and so the demand for naira will rise.
Represented on the diagram below:

Figure 1. Demand Shift

Source: Virtual Bank of Biz/ed.

Figure 2. Supply Shift

Source: Virtual Bank of Biz/ed.

As we can see, both the exchange rate and the volume of currency traded have increased. This will not inevitably be the effect as there may be other factors affecting the exchange rate at the same time. A
lot will also depend on whether the foreign exchange market expected the interest rate increase or not. However, supply and demand gives us a very useful tool for analysing movements in the exchange rate.

**Spot exchange rates**

The spot exchange rate is the rate existing in the market at any given moment. It can be considered as the rate of exchange for immediate delivery of the currency. The spot rate will change all the time according to the changes in supply and demand in the market.

**Forward exchange rates**

The forward exchange rate is a rate for a given time in the future. A price is agreed now for an exchange at some time in the future (often 3 months or so). Whatever happens to the spot rate between now and then, the contracts will be met at the rate that was agreed. Companies may use the forward market to protect themselves against the foreign exchange risk. They know they can buy at a guaranteed rate for the future, and so can plan ahead. This process is called 'hedging' against risk. The existence of the forward market also creates the potential for speculation. Depending on the reason for buying or selling the currency the dealer could end up better off or worse off.

**Purchasing Power Parity**

The purchasing power parity exchange rate is the exchange rate between two currencies, which would enable exactly the same basket of goods to be purchased. In other words, the rate at which purchasing power will be the same in both countries. For example, say a basket of goods cost $50 in the USA, and the same basket cost N5, 825 in Nigeria. The PPP rate between the Naira N and the $ would then be $1= N116. The PPP rate is often used when trying to work out consistent measures between countries like GDP or standard of living. It will generally be different to the actual equilibrium exchange rate, though it will be a factor influencing it.

**Effective Exchange Rate**

The effective exchange rate is also called the 'sterling index' or perhaps the 'sterling trade-weighted index'. It is an exchange rate calculated from a basket of currencies, and can perhaps best be thought of as an average exchange rate. Each of the currencies included is weighted according to its importance to us. This is worked
out from the amount of trade we do with that country. The currency of a country that we do a large amount of trade with will have a higher weight than one whom we do relatively little trade with. The effective exchange rate can be a useful indicator, as it shows overall exchange rate changes. An individual currency may be affected by factors unique to that country, but the effective exchange rate will still give an overall indication.

**Free or pegged**

If a currency is free-floating, its exchange rate is allowed to vary against that of other currencies and is determined by the market forces of supply and demand. Exchange rates for such currencies are likely to change almost constantly as quoted on, financial markets mainly by banks, around the world. A movable or adjustable peg system is a system of fixed exchange rates, but with a provision for the devaluation of a currency. For example, between 1993 and 1998, the Nigeria Naira (NGN) was pegged to the United States Dollars at N22 to $1. Nigeria was not the only country to do this, from the end of world war two until 1966, Western European countries all maintained fixed exchange rates with the US dollar based on the Bretton Woods system.

**Nominal and real exchange rates**

- The nominal exchange rate $e$ is the price in domestic currency of one unit of a foreign currency.

$$RER = e \left( \frac{P^*}{P} \right),$$

- The real exchange rate ($RER$) is defined as where $P$ is the domestic price level and $P^*$ the foreign price level. $P$ and $P^*$ must have the same arbitrary value in some chosen base year. Hence in the base year, $RER = e$.

The RER is only a theoretical ideal. In practice, there are many foreign currencies and price level values to take into consideration. Correspondingly, the model calculations become increasingly more complex. Furthermore, the model is based on purchasing power parity (PPP), which implies a constant RER. The empirical determination of a constant RER value could never be realised, due to limitations on data collection. PPP would imply that the RER is the rate at which an organization can trade goods and services of one economy (e.g. country) for those of another. For example, if the price of goods increased by 10% in the Nigeria and the United State currency simultaneously appreciates 10% against the Naira Nigeria currency,
then the price of the good remains constant for someone in United State.

The people in the Nigeria, however, would still have to deal with the 10% increase in domestic prices. It is also worth mentioning that government-enacted tariffs can affect the actual rate of exchange, helping to reduce price pressures. PPP appears to hold only in the long term (3–5 years) when prices eventually correct towards parity.

More recent approaches in modelling the RER employ a set of macroeconomic variables, such as relative productivity and the real interest rate differential.

\[ NR_i = (RR_i + 1)(Expected \ inflation + 1) - 1 \]

**Bilateral vs. effective exchange rate**

Bilateral exchange rate involves a currency pair, while effective exchange rate is weighted average of a basket of foreign currencies, and it can be viewed as an overall measure of the country's external competitiveness. A nominal effective exchange rate (NEER) is weighted with trade weights. A real effective exchange rate (REER) adjust NEER by appropriate foreign price level and deflates by the home country price level. Compared to NEER, a GDP weighted effective exchange rate might be more appropriate considering the global investment phenomenon.

**Uncovered interest rate parity**

Uncovered Interest Rate Parity (UIRP) states that an appreciation or depreciation of one currency against another currency might be neutralized by a change in the interest rate differential. If US interest rates exceed Nigeria interest rates then the US dollar should depreciate against the Nigeria Naira by an amount that prevents arbitrage. The future exchange rate is reflected into the forward exchange rate stated today. In our example, the forward exchange rate of the dollar is said to be at a discount because it buys fewer Nigeria Naira in the forward rate than it does in the spot rate, the naira is said to be at a premium.

UIRP showed no proof of working after 1990s. Contrary to the theory, currencies with high interest rates characteristically appreciated rather
than depreciated on the reward of the containment of Inflation and a higher-yielding currency.

**Balance of payments model**

This model holds that a foreign exchange rate must be at its equilibrium level - the rate which produces a stable current accounts balance. A nation like Nigeria with a trade deficit will experience reduction in its foreign exchange reserve which ultimately lowers (depreciates) the value of its currency. The cheaper currency renders the nation's goods (exports) more affordable in the global market place while making imports more expensive. After an intermediate period, imports are forced down and exports rise, thus stabilizing the trade balance and the currency towards equilibrium.

Like PPP, the balance of trade model focuses largely on tradable goods and services, ignoring the increasing role of global capital flows. In other words, money is not only chasing goods and services, but to a larger extent, financial assets such as stocks and bonds. Their flows go into the capital account item of the balance of payments, thus, balancing the deficit in the current account. The increase in capital flows has given rise to the asset market model.

**Asset market model**

The explosion in trading of financial assets (stocks and bonds) has reshaped the way analysts and traders look at currencies. Economic variables such as economic growth inflation and productivity are no longer the only drivers of currency movements. The proportion of foreign exchange transactions stemming from cross border-trading of financial assets has dwarfed the extent of currency transactions generated from trading in goods and services.

The asset market approach views currencies as asset prices traded in an efficient financial market. Consequently, currencies are increasingly demonstrating a strong correlation with other markets, particularly equities. Like the stock exchange, money can be made or lost on the foreign exchange market by investors and speculators buying and selling at the right times. Currencies can be traded at spot and foreign exchange option markets. The spot market represents current exchange rates, whereas options are derivatives of exchange rates.
Fluctuations in exchange rates

A market based exchange rate will change whenever the values of either of the two component currencies change. A currency will tend to become more valuable whenever demand for it is greater than the available supply. It will become less valuable whenever demand is less than available supply (this does not mean people no longer want money, it just means they prefer holding their wealth in some other form, possibly another currency). Increased demand for a currency is due to either an increased transaction demand for money, or an increased speculative demand for money. The transaction demand for money is highly correlated to the country’s level of business activity, gross domestic product (GDP), and employment levels. The more people there are unemployed, the less the public as a whole will spend on goods and services. Central Banks typically have little difficulty adjusting the available money supply to accommodate changes in the demand for money due to business transactions.

The speculative demand for money is much harder for a central bank to accommodate but they try to do this by adjusting interest rate. An investor may choose to buy a currency if the return (that is the interest rate) is high enough. The higher country’s interest rates, the greater the demand for that currency. It has been argued that currency speculation can undermine real economic growth, in particular since large currency speculators may deliberately create downward pressure on a currency in order to force that central bank to sell their currency to keep it stable (once this happens, the speculator can buy the currency back from the bank at a lower price, close out their position, and thereby take a profit).

The advocates of flexible exchange rates are of the view that a system of free rate enables a country to pursue an independent economic policy. Its monetary policy has to deflate its currency and hinge the country into depression and unemployment. Internal stability is a better aim to pursue hence a country should look into internal stability of prices, output and unemployment and allow the exchange rate to vary as they would. Such a policy would eliminate external interference with the economy.

Exchange rate acts as shock absorber, if rigidly fixed, the shocks of inflation and deflation from abroad are transmitted to internal economy systems. But variations in the exchange can ward off the invasion of the inflationary and deflationary forces.
If demand and supply could work excellently in economic sense, it would be better to allow exchange rate to be freely determined by both demand and supply.

3.2 MONEY SUPPLY MECHANISM

The money supply, or money stock, could be refers to the total amount of money held by the non bank public at a point in time in an economy. There are several ways to measure such an amount (called a monetary aggregate), but each includes currency in circulation plus demand deposits (checking-account money). Money supply data is recorded and published in order to monitor the growth of the money supply. Public- and private-sector analysts have long monitored this growth because of the effects that it is believed to have on real economic activity and on the price level. The money supply is considered an important instrument for controlling inflation by economists who say that growth in money supply will only lead to inflation if money demand is stable.

Changes in quantity of money supply can either be inflationary or deflationary; these two economic terms are responses to policy of central bank. When central bank expands the amount of money in circulation, inflation occurs and when it reduces the amount of money in circulation deflation occurs.

An expansion of the money supply will bring about proportionate increase in the output of goods and services (assuming there are no changes in the velocity of money in circulation) and the general price level will remain unchanged. Though the term inflation is often taken to mean run away inflation, in such period excessive creation of money gives rise to huge increase in prices, that could be called galloping inflation.

Because (in principle) money is anything that can be used in settlement of a debt there are varying measures of money supply. Since most modern economic systems are regulated by governments through monetary policy, the supply of money is broken down into types of money based on how much of an effect monetary policy can have on that type of money. Narrow money is the type of money that is more easily affected by monetary policy whereas broad money is more difficult to affect through monetary policy. Narrow money exists in smaller quantities while broad money exists in much larger quantities. Each type of money can be classified by placing it along a spectrum between narrow (easily affected) and broad (difficult to affect) money. The different types of money are typically classified as M's. The number of M's usually range from M0 (most narrow) to M3.
(broadest) but which M's are actually used depends on the system. The typical layout for each of the M's is as follows:

- **M0**: Physical currency. A measure of the money supply which combines any liquid or cash assets held within a central bank and the amount of physical currency circulating in the economy. M0 (M-zero) is the most liquid measure of the money supply. It only includes cash or assets that could quickly be converted into currency. This measure is known as narrow money because it is the smallest measure of the money supply.

- **M1**: M0 + demand deposits, which are checking accounts. This is used as a measurement for economists trying to quantify the amount of money in circulation. The M1 is a very liquid measure of the money supply, as it contains cash and assets that can quickly be converted to currency.

- **M2**: M1 + small time deposits (less than $100,000) in the case of US, savings deposits, and non-institutional money-market funds. M2 is a broader classification of money than M1. Economists use M2 when looking to quantify the amount of money in circulation and trying to explain different economic monetary conditions. M2 is a key economic indicator used to forecast inflation.

- **M3**: M2 + all large time deposits, institutional money-market funds, short-term repurchase agreements, along with other larger liquid assets. The broadest measure of money; it is used by economists to estimate the entire supply of money within an economy.

### Importance of Money Supply

Because money is used in virtually all economic transactions, it has a powerful effect on economic activity. An increase in the supply of money puts more money in the hands of consumers, making them feel wealthier, thus stimulating increased spending. Business firms respond to increased sales by ordering more raw materials and increasing production. The spread of business activity increases the demand for labour and raises the demand for capital goods. In a buoyant economy, stock market prices rise and firms issue equity and debt. If the money supply continues to expand, prices begin to rise, especially if output growth reaches capacity limits. As the public begins to expect inflation, lenders insist on higher interest rates to offset an expected decline in purchasing power over the life of their loans.
Opposite effects occurs when the supply of money falls, or when its rate of growth declines. Economic activities decline and either disinflation (reduced inflation) or deflation (falling prices) results.

**Money supply Determinant**

Central Bank policy is the most important determinant of the money supply. Central Bank affects the money supply by affecting its most important component, bank deposits. Here's how it works. The Central Bank requires commercial banks and other financial institutions to hold as reserves a fraction of the deposits they accept. Banks hold these reserves either as cash in their vaults or as deposits at Central Bank. In turn, Central Bank controls reserves by lending money to banks and changing the "inter bank lending rate" on these loans and by "open-market operations." The Central Bank uses open-market operations to either increase or decrease reserves. To increase reserves, Central Bank buys Government Treasury securities by writing a check drawn on it-self. The seller of the Treasury security deposits the check in a bank, increasing the seller's deposit. The bank, in turn, deposits Central Bank check at its state branches, thus increasing its reserves. The opposite sequence occurs when Central Bank sells Treasury securities: the purchaser's deposits fall and, in turn, the bank's reserves fall.

If the Central Bank increases reserves, a single bank can make loans up to the amount of its excess reserves, creating an equal amount of deposits. The banking system, however, can create a multiple expansion of deposits. As each bank lends and creates a deposit, it loses reserves to other banks, which use them to increase their loans and, thus, create new deposits, until all excess reserves are used up.

**3.3 GOVERNMENT EXPENDITURE**

Government spending or government expenditure is classified by economists into three main types. Government purchases of goods and services for current use are classed as government consumption. Government purchases of goods and services intended to create future benefits, such as infrastructure investment or research spending, are classed as government investment. Government expenditures that are not purchases of goods and services, and instead just represent transfers of money, such as social security payments, are called transfer payments. Government spending can be financed by seigniorage, taxes or government borrowing.
The first two types of government spending, namely government consumption and government investment, together constitute one of the major components of gross domestic product.

Government expenditure are in various forms, with the ultimate aim is stabilising the economy, these expenditure are finance through various means from borrowing, taxes and revenue from crude oil, the case in Nigeria. Taxation and borrowing have been very instrumental to the reduction of money in circulation therefore cutting down inflation in the economy. This is achieves by reducing the amount of purchasing power in the hands of the public, thereby reducing the demand for consumer goods, so that there will be no tendency for prices to rise. Government failure to cover its expenditure, could force creation of additional money. That would be inflationary gap; such inflationary gap is the current inflation minus the inflation target, while the output gap is the current GDP minus the potential GDP. This is a situation where demand outstrips production capacity: a situation in which the demand in an economy exceeds productive potential, leading immediately to inflation and an unfavourable balance of trade. The term inflationary gap was first used by Keynes to describe a situation where there is anticipated of excess expenditure over the available output.

An inflationary gap, in economics, is the amount by which the real Gross domestic product, or real GDP, exceeds potential GDP, the real GDP is also known as GDP "adjusted for inflation", "constant prices" GDP or "constant dollar" GDP, because it measures the aggregate output in a country's income accounts in a given year, expressed in base-year prices. On the other hand, the potential GDP is the quantity of real GDP when a country's economy is at full-employment. Nigeria’s economy is struggling to leverage the country’s vast wealth in fossil fuels in order to displace the crushing poverty that affects about 57 percent of its population. Economists refer to the coexistence of vast natural resources wealth and extreme personal poverty in developing countries like Nigeria as the “Resource curse”. Nigeria’s exports of oil and natural gas—at a time of peak prices—have enabled the country to post merchandise trade and current account surpluses in recent years. Reportedly, 80 percent of Nigeria’s energy revenues flow to the government, 16 percent covers operational costs, and the remaining 4 percent go to investors. However, the World Bank has estimated that as a result of corruption 80 percent of energy revenues benefit only 1 percent of the population. During 2005 Nigeria achieved a milestone agreement with the Paris Club of lending nations to eliminate all of its bilateral external debt. Under the agreement, the lenders will forgive
most of the debt, and Nigeria will pay off the remainder with a portion of its energy revenues. Outside of the energy sector, Nigeria’s economy is highly inefficient. Moreover, human capital is underdeveloped—Nigeria ranked 151 out of 177 countries in the United Nations Development Index in 2004 and non-energy-related infrastructure is inadequate.

THEORETICAL FRAMEWORK

3.4 Theories of inflation
In respect to the determinants of inflation, there are various theories proposed by various economists to explain the occurrence of inflationary situations. In this study, the various theories of inflation are grouped basically into two broad theories, the excess-demand theories under the umbrella of expectations-augmented Phillips curve (which comprises the monetarist and the Keynesians theories of inflation) and the cost-push theories which are currently termed structuralists/institutional theories of inflation.

An overview of theories and solutions:
This literature will discuss theories, the cause of inflation and how one could defeat inflation. Inflation is a complex phenomenon which is not yet fully understood. There are two approaches, to adopt in the study of inflation; monetary and non-monetary. According to monetarists, inflation is said to occur only as a result of the increase in the money supply and they are of the view that it starts and ends with it. The non-monetarist based their point on the importance of other factors as causes of inflation.

We have to look at the classical theory of inflation, the Keynesian theory as well as the structural theory of inflation.

What is inflation?
The definition of inflation as earlier defined is a general rise in the price level in an area over a certain period of time. The usual approximate measure of this is the Consumer Price Index which weighs the prices of different goods according to importance in a typical budget and then to see how much the prices of these goods have increased. This immediately raises some problems. For example the weighting must change over time. The importance of computers was not measured in the price index 100 years ago. Another problem
is the failure of the price index to capture changes in quality. Has the price of a good risen by 10% if the quality at the same time has improved by 20%. The consumer price index says so, but many would disagree. Hence, inflation is not easy to define in practice. This should be kept in mind when discussing how to defeat inflation.

The Classical theory: The money supply
One way of defeating inflation, according to the early classical economists, is to reduce the money supply. The prescription arises from their belief that the economy always operates in equilibrium. The result of this belief is that when the money supply increases, this will simply result in more money chasing the same amount of goods. The excess demand will then increase the price level back to equilibrium (fast or immediately) and nothing in the "real" sector of the economy has changed. The only difference is an increase in the price level. Clearly there are some problems with this model. The main problem is that it ignores the possible rigidities in the economy. For example the adjustment processes might work at different speeds. Another problem is that it does not account for the real affects of changes in the monetary sector to the goods sector.

KEYNESIAN INFLATION THEORY
According to Keynesian, inflation can be caused by increase in demand and or increase in cost. In response to the deficiencies of the Classical theory, Keynes developed a new theory of inflation. This theory stressed rigidities in the economy, most importantly in the labour market. This source of rigidities was that workers were reluctant to reduce their nominal wages. Rigidity was that firms did not always change their prices as a response to changes in demand, often increasing output instead. Putting these rigidities (and others) together one gets what is called a fixed-price model. In this model there are several ways of defeating inflation. The basic cause of inflation is excess aggregate demand and hence the most obvious cure is to reduce aggregate demand. The policy instruments available to do this could be tax increases or cuts in public spending. Another possibility in this model is to reduce the rigidities.

Demand-pull inflation is a situation where aggregate demand persistently exceeds aggregate supply when the economy is near or at full employment. Aggregate demand could rise because of several reasons. A cut in personal income tax would increase disposable income and contribute to a rise in consumer expenditure. A reduction in the interest rate might encourage an increase in investment as well as lead to greater consumer spending on consumer durables. A rise in
foreigners' income may lead to an increase in exports of a country. An expansion of government spending financed by borrowing from the banking system under conditions of full employment is another cause of inflation.

An increase in demand can be met initially by utilizing unemployed resources if these are available. Supply rises and the increase in demand will have little or no effect on the general price level at this point. If the total demand for goods and services continue to escalate, a full employment situation will eventually be reached and no further increases in output are possible. This leads to inflationary pressures in the economy.

Demand-pull inflation is caused by excess demand, which can originate from high exports, strong investment, rise in money supply or government financing its spending by borrowing. If firms are doing well, they will increase their demand for factors of production. If the factor market is already facing full employment, input prices will rise. Firms may have to bid up wages to tempt workers away from their existing jobs.

It is most likely that during full employment conditions, the rise in wages will exceed any increase in productivity leading to higher costs. Firms will pass the higher costs to consumers in the form of higher prices. Workers will demand for higher wages and this will add fuel to aggregate demand, which increases once again. The process continues as prices in the product market and factor market are being pulled upwards.

Keynesian theory of cost-push inflation attributes the basic cause of inflation to supply side factors. This means that according to Keynesian, rising production costs will lead to inflation.

Cost-push inflation is usually regarded as being primarily a wage inflation process because wages usually constitute the greater part of total costs. Powerful and militant trade unions that negotiate wage increases in excess of productivity are more likely to succeed in their wage claims the closer the economy is to full employment and the greater the problem of skill shortages.

An increase in the price of coal, oil and many other basic inputs or even semi-manufactured goods used as component parts in the production process will manifest itself as higher consumer prices. The

Inflation may occur when there is a depreciation of the home currency. A depreciation of a country's currency results in increases in the price of imported foodstuff, raw materials and capital equipment which then results in a rise in production costs.

A significant increase in the level of indirect taxes (taxes on goods and services) will raise domestic prices independently of the state of demand and could be a causal factor in creating wage-push pressure on the economy. When firms are faced with higher wage costs, they push up the prices of their products to maintain their profits. Sometimes, they may even seize the opportunity to increase their profit margins. The more prices inelastic the demand for their goods, the less likely such behaviour will lead to a fall in demand for their products.

Cost push inflation is inevitable when there is a struggle between workers and firms. Both try to maintain their real incomes by bidding up their wages and profits. Workers force firms to give inflationary pay increases while firms increase prices so as to raise their profit margins. Price rises are inevitable. This process is known as a wage-price spiral.

**Structural Theory**

This theory is believed to have originated from the less developed countries (LCD’s) South America to be specific shortly after the Second World War. Chilean economist Osvaldo Sunkel (1962) has written extensively on inflation and economic development and Geoff Riley (2006) also has an over view that, instead of focusing on monetary phenomena as a root of the problem, inflation in developing nations such as Latin America and some Africa countries are related to non monetary imbalance.

The cost-push theory of inflation is a generic term for Marxists, Structural theory and Keynesians theories of inflation that are not based on excess-demand influences on the economy. In this group of theories of inflation, a host of non-monetary supply oriented factors influencing the price levels in the economy are considered. Thus cost-push causes of inflation result when cost in production increases independently on aggregate demand. The Keynesians argued that wage mark-up via trade unions lead to increases in the cost of
production. For the affected firms in this regard to maintain their profit margins, they will have to increase prices of their products. The increases in the prices will further put pressure on the trade unions to press for higher wages which will ultimately lead to further increases in prices and the process continuing that circular manner, known as the price-wage spiral. The extent to which price-wage spiral affect the increases in the general price level (inflation) depends on the power of trade-unions relative to employers association. The Keynesians went on to point out that when firms gain more market power, they will be able to push up prices independently in order to make profit. This is the case when markets are concentrated and move towards monopoly or oligopoly through mergers. Structuralism ideas on cost-push causes of inflation can be summarized by J. Laurence Laughlin views in his article in the 1909 journal of political economy He started by rejecting the monetarist explanation of inflation. Instead, he proposed that the causes of inflation “must be sought in the (real) forces settling particular prices” Structuralisms believe that, conflicts over the distribution of income between capital and labour, between landowners and peasants, between different producers in different sectors, is the main cause of inflation. This is due to the fact that demand for higher income by one of the following groups (labour, landowners and different producers in different sectors) in excess of their productivity can only be achieved by each of the other groups (firms, peasants and different producers indifferent sectors) via increases in prices of their products. The structural theory also considers currency depreciation as an essential part in explaining inflationary situations. This is due to the fact that, in the structuralisms’ production process, emphasis is placed on capital input. This implies that in countries were there is lack of foreign reserves; currency depreciation becomes a serious problem with or without foreign exchange control. The currency depreciation leads to high cost of imported raw materials for production, which are ultimately passed onto higher prices for goods and services. Besides, Structural advocates such as Pazos (1972), Arida and Andre (1985) also pointed out that inflation is generally caused by inertia. Inflation inertia is a process where the current inflation rate is determined by its past history. This is generally caused by inflationary expectations, relative price adjustments, institutional adjustments that support the indexation of wages, financial contracts, monetary and exchange rate policy frameworks.

From the Keynesian and the structural theories of cost-push causes of inflation, the following general factors can be identified as the agents of inflation; wage increases by trade unions, profit motives of firms
that gain market power, increase in the prices of raw materials imported from abroad through currency depreciation and price increase in the world commodity market, structure of landownership, inertia, taxes such as value added tax (VAT) and the presence of external shocks such as a dramatic change in oil prices, crop failure and war.

The structuralists divided the phenomena of inflation into two parts.
1. Excess demand over supply in specific markets, e.g. agricultural, industrial and public sectors.
2. Application of initial price increase to what they call the “propagation mechanism” They believe the phenomena of inflation starts with population and income growth which both lead to growth of demand in economy.

Let’s take the markets mentioned above in the first phenomena, supply is generally inelastic and price increases by itself due to shortage in supply. The Second phenomenon which is propagation mechanism has conflicts over distortion in the income distribution due to inflation. This often leads to reallocation of resources from public to private sector in situation where budget receipts are based on the past period’s level of prices, expense are based on current prices.

Basic Hypothesis Summarized by Structuralists
1. Demand shift hypothesis
2. Agricultural bottleneck hypothesis
3. Export instability hypothesis
4. Foreign exchange scarcity hypothesis

The structuralists projected some measures to increase the elasticity of supply in the lagging sector such as land reform, export diversification and tax reform. Demand pressure could be directed to other sectors with more elasticity supply especially through import substitution.

3.5 REVIEW OF EMPIRICAL STUDIES

Inflation is usually viewed in two broad forms monetarist and structuralist.

Monetarists assert that the empirical study of monetary history shows that inflation has always been a monetary phenomenon. The quantity theory of money, simply stated, says that the total amount of spending in an economy is primarily determined by the total amount of money in existence. From this theory the following formula is created:
\[ P = \frac{D_C}{S_C} \]

where \( P \) is the general price level of consumer goods, \( D_C \) is the aggregate demand for consumer goods and \( S_C \) is the aggregate supply of consumer goods. The idea is that the general price level of consumer goods will rise only if the aggregate supply of consumer goods falls relative to aggregate demand for consumer goods, or if aggregate demand increases relative to aggregate supply. Based on the idea that total spending is based primarily on the total amount of money in existence, the economists calculate aggregate demand for consumers' goods based on the total quantity of money. Therefore, they posit that as the quantity of money increases, total spending increases and aggregate demand for consumer goods increases too. For this reason, economists who believe in the Quantity Theory of Money also believe that the only cause of rising prices in a growing economy (this means the aggregate supply of consumer goods is increasing) is an increase of the quantity of money in existence, which is a function of monetary policies, generally set by central banks that have a monopoly on the issuance of currency, which is not pegged to a commodity, such as gold.

The Structuralists argued that, there exist rigidities in areas food supply foreign exchange constraints and budget constraints mostly in developing economies that create structural vulnerabilities to inflation. It further stress on the structural factors like food prices, wages, exchange rate and the likes. An increase in supply of money is a permissive factor that allows inflationary spiral to manifest itself and become cumulative. No one denies that inflation is associated with excessive money supply, but opinions differ as to whether excessive money supply as a cause. Several authors in Nigeria and Africa carried out studies in relation to inflation and causes, Oyejide (1972) explains the issue in question, results from regression carried out indicates that direct relationship exist between inflation and alternative measures of deficit financing (1957-1970). In case of Zimbabwe both monetary and structural factors (monetary growth, foreign prices, exchange and interest rates, unit labour lost and output) were considered as root cause of inflation carried out by Chhibber et al (1989) macroeconomic effects of devaluation in Zimbabwe a CGE analysis.

Chhibber and Shafik (1992) carried out a study on Ghana inflationary trend (1965-1988) and pointed out that growth in money supply is one
official variable that is responsible in Ghana’s inflation. Such variable are official exchange rate and real wages could only exert negligible influence on inflation. Substantial level of positive relationship was found between the parallel market exchange rate and general price level.

1990, Inflationary trends and control in Ghana, In an econometric model using an error correction framework to capture both long-run and short-run determinants of inflation in Ghana, Sowa (1994) affirmed earlier results of Sowa and Kwakye (1991) that inflation in Ghana, at least in the short run, is caused principally by output supply constraints. These results run counter to results of Chhibber and Shafik (1991) that inflation in Ghana is more of a monetary phenomenon. A cursory glance at the inflationary trends in Ghana shows how closely the food inflation mimics the headline inflation

M.O. Odedokun (1995) identifies in his studies causes of inflation in sub Sahara Africa. By employing econometrics to analyze annual reports data for 35 countries from 1971–1990. The findings suggest that monetary growth, the rate of domestic currency depreciation, and the expectation of inflation have positive effects on inflation, while expansion of per capita food production as well as overall economic growth serve to reduce inflation rates. We are unable to detect positive effects of fiscal deficit variables, foreign inflation rates, or the growth of import prices on the domestic inflation rates.

Samuel A. Laryea and Ussif Rashid Sumaila (2001) base on quarterly data from 1992:1 to 1998:4 The results from the econometric regression analysis shows that inflation in Tanzania, either in the short run or the long run, is influenced more by monetary factors and to a lesser extent by volatility in output or depreciation of the exchange rate. It recommended that to control inflation in Tanzania, the government should pursue tight monetary and fiscal policies. In the long run, the government should also pursue policies to increase food production, to ease some of the supply constraints. These results corroborate studies on inflation in other African economies. For example, Sowa (1994), Sowa and Kwakye (1991) and Chhibber and Shafik (1992) obtain similar results for Ghana. Also the short run elasticity of money, 0.3, is greater than the short run output elasticity -0.06, emphasizing the importance of monetary factors in the inflationary process in Tanzanian and concluded that rate of inflation in Tanzania which hovered around 30% on average in the early 1990’s, dropped to about 13% by the end of 1998. They employ various econometric techniques to explain the main determinants of inflation both in the long run and in the short run. In the short run, output and
monetary factors are the main determinants of inflation. However, in the long run, the parallel exchange rate also plays a key role, in addition to output and money. The positive coefficients of the exchange rate variable reflect the effect on inflation via trade in goods, mainly through imports in the informal sector.

Morley (1992) analyzed the effect of real exchange rates on output for twenty-eight devaluation experiences in developing countries using a regression framework. After the introduction of controls for factors that could simultaneously induce devaluation and reduce output including terms of trade, import growth, the money supply, and the fiscal balance, he observed that depreciation of the level of the real exchange rate reduced the output.

Kamin and Klau (1998) using an error correction technique estimated a regression equation linking the output to the real exchange rate for a group of twenty-seven countries. They did not find that devaluations were contractionary in the long term. Additionally, through the control of the sources of spurious correlation, reverse causality appeared to alternate the measured contractionary effect of devaluation in the short term although the effect persisted even after the introduction of controls. Apart from the findings from simulation and regression analyses, results from (vector auto-regression) VAR models, though not focused mainly on the effects of the exchange rate on the output per se, are equally informative. Ndung’u (1993) estimated a six-variable VAR—money supply, domestic price level, exchange rate index, foreign price index, real output, and the rate of interest—in an attempt to explain the inflation movement in Kenya. He observed that the rate of inflation and exchange rate explained each other. A similar conclusion was also reached in the extended version of this study (Ndung’u 1997).

Kamas (1995) study on Colombia extended the works of Montiel (1989) and Dornbusch, Sturzenegger, and Wolf (1990) by separating the base money into domestic credit and reserves, with a view to identifying the domestic monetary impulses as well as analyzing their effects on the balance of payments. He observed that exchange rates did not play an important role in explaining the variation in inflation in Colombia and that inflation appeared to be primarily inertial with respect to the exchange rate but largely determined by demand shocks. Khan (1989) applying two different econometric approaches—an theoretical vector auto-regression and a structural production
function—concluded that the net effect of a decline in the value of the dollar is a temporary increase in inflation and real output, followed by a permanent reduction in output and level of real wages.

In several other studies the relationship between exchange rates and inflation has also been investigated. It was explicitly concluded that exchange rate devaluation is a major factor for the upsurge of inflation (Kamin 1996; Odedokun 1996; London 1989; Canetti and Greene 1991; Calvo, Reinhart, and Vegh 1994; Elbadawi 1990).

Kamin (1996) showed that the level of the real exchange rate was a primary determinant of the rate of inflation in Mexico during the 1980s and 1990s while Calvo, Reinhart, and Vegh (1994) identified correlations between the temporary components of inflation and the real exchange rate in Brazil, Chile, and Colombia. Elbadawi (1990) also noted that precipitous depreciation of the parallel exchange rate exerted a significant effect on inflation in Uganda. Odedokun (1996), Canetti and Greene (1991), Egwaikhide, Chete, and Falokun (1994), and London (1989) reached similar conclusions for some selected African countries, including Nigeria.

In conclusion, most of the econometric analyses indicated that devaluations (either increases in the level of the real exchange rate or in the rate of depreciation) were associated with a reduction in output and increase in inflation. The few VAR studies reviewed above equally supported the existence of a contractionary devaluation in the sampled countries. However, we observed that most cases of contractionary devaluations had been focused on Latin America and other developed nations.

Studies conducted on the issue in sub-Saharan Africa, particularly Nigeria. More importantly, there are few data on contractionary devaluation in Nigeria based on regression and simulation analyses. Our study intends to demonstrate the existence of contractionary devaluation in Nigeria by applying the restricted vector autoregressive model, drawing from previous studies conducted in the other countries reviewed above. This approach may enable to identify other shocks that might exert important influences on output and inflation in Nigeria. To achieve this objective, a six variable VAR was estimated (official exchange rate, parallel exchange rate, prices, income, money supply, and interest rate).
CBN-NISER (1998). (Nigeria Institute of Social and Economic Research) Also support the positive relationship. It was argued that this positive relationship would be maintained unless some critical factors (e.g., transaction cost, immediacy, and disclosure) distinguishing the operations of the two markets are addressed. For instance, while the transaction cost (e.g., cost of processing and documentation) is marginal in the parallel market, it is however substantial in the official market. Also, while immediacy is an important feature of parallel market operations, undue delays (ranging between sixty and ninety days) (CBN-NISER) often characterize the official market. And since timeliness is an important factor in business operations, market agents tend to prefer the parallel market to the official one, especially in the purchase of spare parts. Besides, strict adherence to disclosure of information and documentation which is an important feature of the official market does not exist in the parallel market. All these factors tend to support the ever-increasing use of parallel market operations. Consequently, more pressure is put on the demand for foreign exchange in the parallel market and hence the widening gap between the two rates. This supported Greene and Canetti (1991) evaluated the relative strength of exchange and monetary expansion in propagating inflation in ten Africa countries, that exchange rate movement explains the inflationary trend in these countries.

London (1989) examined on money supply and exchange rate, in the inflationary process of twenty three Africa countries. The application of pure monetarist model on supply, expected inflation and real income were significant determinants of inflation for the period between 1974 and 1985.exchange rate was later included as one of the explanatory variables in pure monetarist model. The result shows that exchange rate movement had remarkable influence on the inflationary process in 1980s

3.6 PHENOMENON OF THE DUTCH DISEASE MODEL

Dutch Disease and economic policy

Dutch Disease results from an appreciation of the exchange rate, caused by the large inflows of petroleum revenues, which again leads to reduced competitiveness of various non-petroleum sectors of the economy. Dutch Disease will often have particularly serious effects on the poor because traditional sectors such as agriculture and other production in rural areas will loose out to imports that become more competitive as a result of currency appreciation. A further
specialization of the economy on the resource sector and production of non-tradable (sheltered from international competition) occur due to escalation in public spending.

Dutch Disease earned its name after experiences the Netherlands made in the aftermath of large discoveries of natural gas reserves in the 1960. The phenomenon is old, however; for example the economic decline of Spain following the exploitation of minerals in Latin America bears close resemblance to modern type Dutch Disease problems.

Dutch Disease effects surfaced among capital deficient oil exporters from the late 1970s and in the 1980s. As in the Netherlands lack of fiscal discipline led to accumulated higher external debts with an ensuing debt service ratio which burdened public budgets and reduced opportunities to invest in human and physical capital. The countries were thus caught in a negative spiral of economic deterioration as low saving and lack of private sector investments inhibited a diversified economic growth.

This is the Nigeria case oil boom has cause a neglect to many of her sectors that had sustained the country before the discovery of crude oil in commercial quantity. Boom experienced in 1973/74 and gain 1979/80 largely transformed the structure of the economy. During the 1990 Gulf war and the current oil boom Nigeria experienced huge revenue from oil, this has cause the nation which has relied solely on petroleum a total neglect of other sectors of the economy. Most economists from Nigeria rather see it as a curse rather than fortune, today over 94 percent of Nigeria revenue comes from oil.
CHAPTER 4

4.1 MODEL AND EMPIRICAL ESTIMATION
We start by looking at the appropriate methodology to carry out the empirical analysis of the study. We adopted ADF test for unit root as well as using Johansen to test for co-integration. This Study examines the impact of exchange rate on the level of inflation in Nigerian economy. Also, it evaluates the relationship between money supply, revenue from oil, exchange rate, government expenditure and inflation in Nigeria.

Inflation (IF) serves as our dependent variable while money supply (M1), oil revenue (REV), government expenditure (G) and average naira/dollar exchange rate (EX) are independent variables.

4.2 PRESENTATION OF THE MODEL
The model expresses inflation as a function of money supply lag one, nominal effective exchange rate lag one, oil revenue lag one and government exchange lag one.

\[ I_t = f(M1, EX, REV, G) \]

It can be expressed better in this equation as:

\[ I_t = \alpha + \alpha_1 M_{t-1} + \alpha_2 EX_{t-1} + \alpha_3 REV_{t-1} + \alpha_4 G_{t-1} + \epsilon_t \]

This is given,
- **I** = Inflation
- **MI** = Money supply
- **G** = Government Expenditure
- **EX** = Exchange rate
- **Rev** = Oil Revenue
- **\epsilon_t** = RANDOM ERROR TERM
- **\alpha** = constant

We applied the unit root test to determine the order of integration of variables using the Augmented Dickey Fuller tests.

In ADF test, the choice of optimal lag order is determined by the Akaike information criterion AIC. The variable that has unit root is non-stationary at the level form, but stationary after differenced. This type of variable is said to be integrated of order one or two denoted by I (1) or I(2) depending on the number of times it was differenced. It is very important to further test for the linear combination between them.
If they are co integrated, then the variables genuinely related and they establish a long run relationship. We test for co integration by utilizing the Johansen. If the variables are co integrated, then the vector error correction (VEC) model is employed. For the purpose of this study we will limit our tests to unit root and co integration. The first test in our analysis is to check the order of integration of the variables by testing for unit root using ADF. Augmented Dickey-Fuller (ADF) (1979), based on the following model, and introduced a robust test for unit root, which is specified as follows:

$$\Delta Y_t = \alpha + \beta t + \theta Y_{t-1} + \sum_{p=1}^{\infty} \Delta Y_{t-p} + \varepsilon_t$$

\(\Delta Y_t\) = change in \(y\) variable at time \(t\)
\(\alpha\) = Drift
\(\beta\) = Deterministic trend (coefficient on a time trend)
\(\theta\) = Constant
\(\Sigma\) = summation
\(P\) = lag order
\(\varepsilon_t\) = Error term at time \(t\)

In this model, the pair of hypothesis:

- \(H_0: \beta = 0\) (non stationary, unit root exist)
- \(H_a: \beta < 0\) (stationary)

Table 4.1 ADF Tests

<table>
<thead>
<tr>
<th></th>
<th>Test</th>
<th>Deterministic terms</th>
<th>Optimal Lag length</th>
<th>Test Statistic</th>
<th>5% Critical Value</th>
<th>1% Critical Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exchange Rate</td>
<td>ADF</td>
<td>C</td>
<td>0</td>
<td>-1.206</td>
<td>-3.57</td>
<td>-4.29</td>
</tr>
<tr>
<td>Revenue from Oil</td>
<td>ADF</td>
<td>C</td>
<td>0</td>
<td>-2.955</td>
<td>-3.57</td>
<td>-4.29</td>
</tr>
<tr>
<td>Inflation</td>
<td>ADF</td>
<td>C</td>
<td>1</td>
<td>-3.454</td>
<td>-3.57</td>
<td>-4.29</td>
</tr>
<tr>
<td>Government</td>
<td>ADF</td>
<td>C</td>
<td>6</td>
<td>-2.139</td>
<td>-3.57</td>
<td>-4.29</td>
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<tr>
<td>Money supply</td>
<td>ADF</td>
<td>C</td>
<td>3</td>
<td>-1.583</td>
<td>-3.57</td>
<td>-4.29</td>
</tr>
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</table>
4.3 INTERPRETATION OF RESULT

UNIT ROOT TEST
For convenience purpose, the table above showed the summary of the computed ADF test for a unit root for each of the variables. The optimal lag length in the ADF is determined by using the information criterion: AIC with the lowest value. We accept null hypothesis if the computed ADF test-statistic is greater than critical values. If not the null hypothesis is rejected. Our results on the test proved to be in support of non stationary I(1).

The result for Inflation, the null hypothesis cannot be rejected at 5% and 1% significant level respectively. This implies that the rate of Inflation in the country is integrated of order one I (1). For Exchange rate, Money supply and Government Spending, the null hypotheses cannot be rejected at 5% and 1% significant level respectively. This means the variables series are integrated I (1) at both critical levels. While for Oil revenue, the null hypothesis cannot be rejected at 5% and 1% as well. This implies that unit root exists and they seem to follow a random walk.

TEST FOR CO INTEGRATION
Co-integration is an econometric property of time series variables. If two or more series are themselves non-stationary, but a linear combination of them is stationary, then the series are said to be co-integrated. Co-integration test aims at identifying whether the long term economic relationship existing among variables is stable. The test is carried out using Johansen co-integrated test (1991). Some of the concepts of the equation have been described above except $\Pi$, $\mu$, and $\Gamma$

$$\Delta Y_t = \mu + \Pi y_{t-1} + \sum_{i=1}^{P-1} \Gamma_i \Delta Y_{t-i} + \varepsilon_t$$

Where

$$\Pi = \sum_{i=1}^{p} A_{i-1} \text{ and } \Gamma_i = -\sum_{j=i+1}^{p} A_j$$

$\Pi = \text{Rank}$
$\mu = \text{Vector constant}$
$\Gamma = \text{Lag order}$
Our hypothesis: $H_0 = \Pi = 0$ (co-integration does not exist)
$H_A = \Pi < 0$ (co-integration exist)

If the coefficient matrix $\Pi$ has reduced rank $r < n$, then there exist $nxr$ matrices $\alpha$ and $\beta$ each with rank $r$ such that $\Pi = \alpha \beta'$ and $t \beta'y$ is stationary. $r$ is the number of co-integration relationships, the elements of $\alpha$ are known as the adjustment parameters in the vector error correction model and each column of $\beta$ is a co-integration vector. It can be shown that for a given $r$, the maximum likelihood estimator of $\beta$ defines the combination of $yt-1$ that yields the $r$ largest canonical correlation of $\Delta yt$ with $yt-1$ after correcting for lagged differenced and deterministic variables when present. Johansen proposed two different likelihood ratio tests of the significance of these canonical correlations and thereby the reduced rank of the $\Pi$ matrix: the trace test and maximum eigenvalue test, shown in equation below;

$$J_{\text{trace}} = -T \sum_{i=r+1}^{n} \ln(1 - \lambda^i)$$

$$J_{\text{max}} = -T \ln(1 - \lambda^{r+1})$$

Here $T$ is the sample size and $\lambda^i$ is the $i$:th largest canonical correlation. The trace test tests the null hypothesis of $r$ co-integrating vectors against the alternative hypothesis of $n$ co-integrating vectors. The maximum eigenvalue test, on the other hand, tests the null hypothesis of $r$ co-integrating vectors against the alternative hypothesis of $r + 1$ co-integrating vectors.

**Test Result for Inflation, Exchange rate, Money supply, Oil revenue and Government spending.**
I(1) -1.cointegration analysis, 6 to 38

| Table 4.2 |
|------------------|------------------|------------------|------------------|
| **eigenvalue**   | **loglik for**   | **rank**         |
| 1410.560         | 0.96853          | 1353.494         |
| 1316.590         | 0.89317          | 1316.590         |
| 1296.751         | 0.69953          | 1296.751         |
| 1281.747         | 0.59720          | 1281.747         |
| 1268.863         | 0.54198          | 1268.863         |
H0: rank≤ Trace test [Prob]

<table>
<thead>
<tr>
<th>rank</th>
<th>Eigenvalue</th>
<th>loglik for Rank</th>
</tr>
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<tbody>
<tr>
<td>4</td>
<td>25.768</td>
<td>[0.000] **</td>
</tr>
<tr>
<td>3</td>
<td>55.775</td>
<td>[0.000] **</td>
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<tr>
<td>2</td>
<td>95.454</td>
<td>[0.000] **</td>
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<tr>
<td>1</td>
<td>169.26</td>
<td>[0.000] **</td>
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<tr>
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<td>283.39</td>
<td>[0.000] **</td>
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Source: Pcgive

Test result for Inflation and Exchange rate
I(1) co-integration analysis, 7 to 40

Table 4.3

<table>
<thead>
<tr>
<th>Eigenvalue</th>
<th>loglik for Rank</th>
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<tr>
<td>0.25478</td>
<td>259.6862</td>
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<tr>
<td>0.14411</td>
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<tr>
<td>0.25478</td>
<td>259.6862</td>
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<tr>
<td>0.14411</td>
<td>257.0407</td>
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H0: rank≤ Trace test [Prob]

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<th>rank</th>
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<td>1</td>
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Source: Pcgive

Test result for Inflation and Money supply
I(1) co-integration analysis, 5 to 38

Table 4.4

<table>
<thead>
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<td>0.28581</td>
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<tr>
<td>0.25016</td>
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<td>0.49085</td>
<td>551.7533</td>
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<tr>
<td>0.25016</td>
<td>547.0030</td>
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</table>

H0: rank≤ Trace test [Prob]

<table>
<thead>
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<th>rank</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5.4017</td>
<td>[0.020] *</td>
</tr>
<tr>
<td>0</td>
<td>16.846</td>
<td>[0.029] *</td>
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Source: Pcgive

Test for Inflation and Government spending
I(1) co-integration analysis, 6 to 38

Table 4.5

<table>
<thead>
<tr>
<th>Eigenvalue</th>
<th>loglik for Rank</th>
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<tr>
<td>0.25016</td>
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H0: rank≤ Trace test [Prob]

<table>
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<th>rank</th>
<th>Eigenvalue</th>
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<td>[0.029] *</td>
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Source: Pcgive
### Test result for Inflation and Oil revenue

I (1) co-integration analysis, 10 to 38

Table 4.6

<table>
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<td>0.71164</td>
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<td>0.15747</td>
<td>496.2242</td>
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H0: rank<= Trace test [Prob]

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<tr>
<td>0</td>
<td>31.776</td>
<td>[0.007] **</td>
</tr>
<tr>
<td>1</td>
<td>9.5006</td>
<td>[0.155]</td>
</tr>
</tbody>
</table>

Source: Pcgive

### Analysis

Johansen's method is a multivariate method based on a VAR representation of the stochastic process. Once the VAR has been formulated, we can determine the number of significant eigenvalues (0 number of cointegrating vectors) in the system. The test can be described as a multivariate form of the ADF-test for unit roots.

The first null is that there are no stationary relations in the data. If the probability value is not below say 0.100 the eigenvalue is not significant. No significance means that the null of no stationary relations (=no cointegration) is not reject. The test is over, and we conclude that there is no cointegration. In case of rejection of the null of no stationary relations, the conclusion is so far, that there is at least one cointegrating vector (r=1).

The results of the analysis shown above, the first part combines sequential tests for co-integration on Inflation, Exchange rate, Money supply, Government spending and Oil revenue. The Johansen test is conducted, since all variables exhibit linear trend it was included in co-integration. The second part combines the sequential test for co-integration for Inflation and Exchange rate, third part combines the
sequential test for co-integration between Inflation and Money supply while the fourth is on Inflation and Government spending. The final part of the sequential tests for co-integration is on Inflation and Oil revenue.

The result implies that we can reject null hypothesis in all our tests except, the test on Inflation and Exchange rate. The test on Inflation and Exchange rate showed that long term relationship does not exist between the variables. That is, no co-integration between them. It is also significant to emphasize that most of the variables are individually non stationary. That is, they all tend to follow a random walk but all the variables exhibit long term relationship when computed together.

In conclusion, our results provide an empirical proof that Money supply, Government spending, Exchange rate, and Oil revenue have a great impact on inflation in Nigeria. Although, Inflation and Exchange rate shows no long term relationship but they are individually integrated I (1).
CHAPTER FIVE

CONCLUSION

From our analysis, we examined the impact of exchange rate on inflation rate and the relationship that exist among government expenditure, money supply exchange rate, oil revenue and inflation in Nigeria. Despite the monetary and fiscal policies measures taken by the government to meet it macroeconomic objectives, assessment of the various policies had shown the measures have no success. From past experience and researched carried out revealed that structural adjustment program was largely responsible for inappropriate measure against inflationary pressure.

Recently, the present government of Nigeria has responded to well by embarking on a comprehensive reform program to achieve macroeconomic goals. The program is base on National Economic Empowerment and Development Strategy (NEED) which has improved the implementation of fiscal and monetary policies. It focused on four major areas to improve the macroeconomic environment, pursuing structural reforms, strengthening public expenditure management and implementing institutional and governance reforms.

The study revealed that, most variables are correlated, which means the impact of each variable on the rate of inflation in the economy is inseparable. Moreover, there is strong long relationship among the variables, though inflation and exchange rate show no long relationship. Measures by government to reducing amount of money supplied, government expenditure and control measure on exchange rate could lead to poor productivity in the country.

We recommend that the policy maker should try to cushion the effect of inflation on the economy when the need arises so that rise in exchange rate will not lead to inflationary pressure in the short run even though inflation and exchange rate have no long term relationship, short term relationship seems to exist.

Based on the study, we limited our scope on inflation. For the purpose of in-depth analysis, other factors affecting inflation apart from exchange rate, money supply, government expenditure and oil revenue should be considered.
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