

**THE IMPACT OF EXCHANGE RATE ON INFLATION RATE ON  
NIGERIAN ECONOMY (1980-2014)**

**BY**

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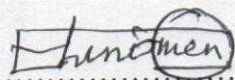
**TO**

**THE DEPARTMENT OF ECONOMICS AND DEVELOPMENT STUDIES,  
FACULTY OF SOCIAL SCIENCES AND HUMANITIES, FEDERAL  
UNIVERSITY OF OYE EKITI, EKITI STATE, NIGERIA.**

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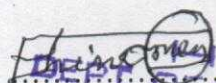
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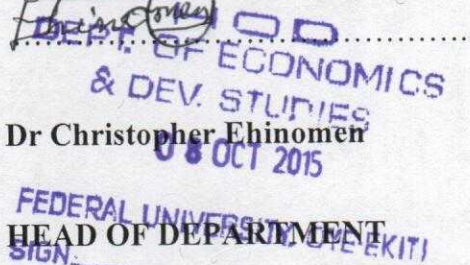


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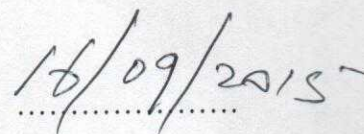
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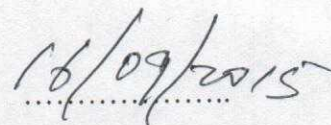
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## DEDICATION

This work is humbly and wholly dedicated to the ever Supreme God, Commander in Chief of the whole universe for his love, guidance, care and infinite mercies throughout my stay in the school. Furthermore, to the whole Angels and Saints of God most especially my guardian Angel who has been at work ever since my birth.

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### *Abstract*

*This study carried out the impact of exchange rate on inflation rate in Nigeria for the period of 34 years, ranging from 1970 to 2014. Generally, Inflation is considered harmful to the economy of any country. The history of the origin of inflation in Nigeria has been dates back to the 1970s during the sharp rise in oil revenue and the implementation of a fixed exchange rate regime within the same period. Consequently, the researcher tried to investigate the short run and the long run relationship between inflation and exchange rate and the other care variables, co-integration a between inflation and exchange rate and other care variables was also carried out. Engel granger approach was used to ascertain the co-integration of the variables. The above is one of the statistical diagnostics carried out before the data analysis. The least square method, Augumented dickey fuller(ADF) unit root test, the Engel Granger approach and the error correction model were adopted to determine the stationarity levels, short run impacts and long run impacts respectively. The researcher discovered among other things that exchange rate has a negative effect on inflation rate both in the short run and the long run, this maybe as a result of structural rigidities and distortions of the government in the economy, also all the care variables account for only about 28% of the causes of inflation, this means that there are some other more important factors that need to be investigated, such other factors may relate to government growing annual deficit budgets, increasing lending rates of commercial banks and so on. Among the recommendations drawn from this study is that the government should improve upon the exchange rate management frameworks and structure in Nigeria, and also the financial institutions and other institutions in charge of the exchange rate management in Nigeria should be strengthened to address the recurrent issues so that the benefit associated with exchange rate stability and inflation rate can be experienced in the Nigerian economy*

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## CHAPTER ONE

### INTRODUCTION

#### 1.1 Background to the study

Exchange rate is the price of one currency in terms of another. Given two currencies, the Naira and the US Dollar, for example, the exchange rate between naira and the dollar is equal to the units of naira needed to purchase one unit of the US dollar. The value of naira in terms of dollars, in this case, is a reciprocal of the N/\$ exchange rate.

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 of 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. 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 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.

The evolution of the foreign exchange market in Nigeria up to its present state 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 abroad (outside Nigeria) by commercial banks which acted as agent 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 in Nigeria.

The foreign exchange market experienced a boom during this period and the management of foreign exchange became necessary to ensure that shortages did not arise. However it was not until 1982 that comprehensive exchange controls were applied as a result of the foreign exchange variations 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 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).

The Nigerian foreign exchange market has witnessed tremendous changes. The Second- Tier Foreign Exchange Market (SFEM) was introduced in September, 1986, the unified official market in 1987.

The foreign exchange market, or forex, is one of the largest markets in the world, and is in constant flux. When its night in one part of the world, its morning in another and exchange rates fluctuates as currencies are bought and sold.

Changes in the exchange rate therefore, have implications for individual spending and investments behaviour of firms, all of which can affect aggregate demand. A market based exchange rate will change whenever the values of either of the two component currencies change

## 1.2 Statement of the problem

The effects of high inflation on the economy are generally considered to be predominantly harmful. Since the 1970s policy makers have been saddled with the responsibility of reducing and stabilizing the inflation rate. Inflation can be decomposed into two, namely: demand side inflation and the supply side inflation. For an open economy like Nigeria, inflation comes from both domestic factors (internal pressures) and overseas factors (external pressures). The external factors result from increase in the world prices of commodities or fluctuation in the real exchange rate. However, the influence of exchange rate on inflation is a function of the exchange rate regime in the country (Noer, Arie and Piter, 2010). The exchange rate regime plays a key role in reducing the risk of fluctuations in the Real Exchange Rate (RER) which will affect the rate of inflation and hence the entire economy. The historical origin of the current inflation in Nigeria dates back to the early 1970s when oil revenue rose sharply resulting in an increase in government spending and aggregate demand without a corresponding increase in domestic output production. The monetization of oil earnings which expanded money supply also resulted to a rise in the general price level.

In July 1986, the deepening economic crisis made the government to introduce the International Monetary Fund (IMF) supported Structural Adjustment Programme (SAP) which was predicated on the principle of "getting prices right" and has exchange rate reform as a major focus (Festus, Chete and Gabriel, 1994). The Second Tier Foreign Exchange Market (SFEM) was introduced in late September 1986 and since then; the naira has depreciated against the American dollar and other major currencies. The Nigerian naira traded at about N4.62k to a U.S. dollar at the introduction of the SFEM and by the last part of 1989, has exceeded N7.65k to a U.S. dollar and inflation jumped from about 5% at the introduction of SFEM to about 41% (Festus, Chete and

Gabriel, 1994). Although the exchange rate became relatively stable in the mid-1990s, it depreciated further to about N120.97, N129.36 and N133.50 in 2002, 2003 and 2004 respectively (Obadan, 2006). This is an indication that the depreciation of the naira is a contributory factor to the inflationary trend in Nigeria. Given the import dependent nature of the Nigerian industrial sector, the continued depreciation of the naira exchange rate vis-à-vis the currencies of other major trading partners, meant that more resources would be needed to increase domestic output. A depreciating exchange rate in the absence of domestic sources of input and inadequate infrastructure has raised the cost of production in Nigeria and hence a high rate of inflation. Nigeria's exchange rate has been more volatile in the post-SAP period due to its excessive exposure to external shocks. The effect of the recent global economic meltdown on Nigerian exchange rate was phenomenon as the Naira exchange rate vis-à-vis the Dollar rose astronomically from about N120/\$ to more than N180/\$ (about 50% increase) between 2008 and 2009. This is attributable to the sharp drop in foreign earnings of Nigeria as a result of the persistent fall of crude oil price, which plunged from an all-time high of US\$147 per barrel in July 2007 to a low of US\$45 per barrel in December 2008 (CBN, 2008). Although various factors have been adduced to the persistence of inflation in Nigeria, it is necessary to examine inflationary trend under the various exchange regimes that had been adopted in the country, and that is the main thrust of this study.

### **1.3 Objectives of the Study**

The broad objective of this study is to examine the impact of Exchange Rate and Inflation Rate on the Nigerian Economy. The specific objectives of the study are as follows:

1. To investigate the impact of exchange rate on inflation rate in Nigeria
2. To investigate whether or not Exchange rate co-integrate with Inflation rate in the short-run or long-run
3. To recommend policy solution based on the above finding.

#### **1.4 Research questions**

To achieve the earlier stated objectives, the following research questions become pertinent

1. What are the effects of exchange rate on inflation rate in Nigeria?
2. What is the relationship between inflation rate and exchange rate in the short run and long run?

#### **1.5 Significance of the study**

The significance of this study depends on the fact that with improved economy Nigeria stands to gain in its effects toward development. This work attempts to answer the question: what are the effects of exchange rate on inflation rate in Nigeria, what is the long run and short run relationship of inflation and exchange rate. This will form the basis upon which suggestions and contributions will be made. This work stands to benefit: Nigeria as a whole; Schools (staffs and students) and policy makers.

#### **1.6 Justification for the study**

The effects of the recent global economic crisis on Nigeria's exchange rate have reaffirmed the urgent need for protection of the economy from exchange rate risk. Although, no country is immune to such global crisis, the over-reliance on oil export revenue by Nigeria exposes her



exchange rate and economy excessively to external shocks. The effect of exchange rate therefore on inflation is dependent on the exchange rate regime in operation in that economy, ever since 1986, flexible exchange rate regime has being in operation in Nigeria in law but not efficiently in practice. Different studies have investigated the effect of exchange rate on inflation rate and some other economic variables but this study would provide an empirical assessment of the impact of exchange rate on inflationary trend in Nigeria. This would go a long way in helping to design policies and measures to combat menace of inflation persistence in the country.

### **1.7 Scope and of the study**

This project focuses on the effect of exchange rate variations on inflationary trend in Nigeria as necessitated by the inflationary pressure generated by recent global economic crisis through the exchange rate sensitivity. Despite the liberalization of the exchange rate in Nigeria since the introduction Structural Adjustment Programme (SAP) in 1986, no meaningful progress has been made in the combat of inflation. Therefore, this study would examine the inflationary trend in Nigeria under various exchange rate with the view of identifying the real cause of inflation persistence in the country and providing the best policies to use. The impact of exchange rate on inflation rate in Nigeria would be investigated empirically with the data spanning from 1980 to 2014.

### **1.8 Organization of the study**

This research work is organized as follows: In Chapter 2, previous studies are reviewed. Chapter 3 explains the methodology and model that includes the model specification, estimation technique, theoretical justification, and methodology. Chapter 4 gives the data presentation, analysis of results and findings Finally, Chapter 5 concludes the paper by giving the summary, policy recommendations, suggestions for further study and the limitations encountered in the cause of the research work.

## **1.9 Definition of terms**

The two key terms that will be frequently considered in this work is

1. The Inflation rate
2. The Exchange Rate

### **Inflation rate:**

Inflation is a sustained increase in the general price level of goods and services in an economy over a period of time. When the price level rises each unit of currency buys fewer goods and services. Consequently, inflation reflects a reduction in the purchasing power per unit of money that is, a loss of real value in the medium of exchange and unit of account within

### **Exchange rate:**

Exchange rate between two currencies is the rate at which one currency will be exchanged for another. It is also regarded as the value of one country's currency in terms of another currency. Exchange rates are determined in the foreign exchange market which is open to a wide range of different types of buyers and sellers where currency trading is continuous

## CHAPTER 2

### REVIEW OF LITERATURE

#### **Introduction**

This section focuses on a review of the empirical literature on the impact of exchange rate on inflation rate in the Nigerian Economy. It examines the definition of different terms , some stylized facts on inflation rate and exchange rate in Nigeria, the channels of transmission, theoretical foundations, methodological review and a review of empirical work on the impact of exchange rate and inflation rate.

#### **2.1 Conceptual Issues**

##### **2.1.1 Definition of 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. Inflation depicts an economic 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 purchasing power of a country's currency falls. 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, it is aggregate or general, which implies that 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. This implies 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.

### **2.1.2 Types of Inflation**

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 effect of this type of inflation is majorly felt by the poor and middle class of the economy. Only strong monetary and fiscal measures can control such inflation. This is where the Nigeria economy finds itself 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 every day. For instance, the current Zimbabwe inflation rate is at 37131.9%.

### **2.1.3 Inflation in Nigeria**

There are various meanings of inflation today but there is a consensus among economists that inflation is a continuous rise in prices or what is called general price level. Simply put, inflation depicts an economic situation where there is a general and persistent rise in prices of goods and services. It could be said to be a continuous rise in prices as measured by the Consumer Price Index (CPI). People describe inflation as a situation where too much money is chasing too few goods. During inflation in an economy, the currency loses purchasing power. When we talk of inflation, it is understood as overall increases in prices of all goods and services as distinct from isolated increase in one or a few goods. The prices increases must also be continuous not a once-for-all increase. Inflation is a world-wide phenomenon and a household name today in Nigeria.

Inflation is usually estimated by calculating the inflation rate of a price Index usually Consumers Price Index (CPI), which measures price changes of a selection of goods and services purchased by a typical consumer. Inflation is the percentage rate of change of price Index over time.

There are other ways of estimating inflation rate for example cost-of-living index (COLI) which is similar to CPI. We also have producer price index (PPI) which measures average changes in prices received by domestic producers for their output. PPI differs from CPI in that price subsidization, profits

and taxes may cause the amount received by the producer to differ from what the consumer paid. PPI measures the pressure being put on producers by cost of raw materials. Depending on demand elasticity for the goods, these costs could be passed on the consumers or absorbed by profits. There are also core price indices which try to remove volatile components such as food and oil from computation of inflation rate. By trying to remove the volatile goods and services, the Core inflation rate calculated is less affected by short run supply and demand conditions in specific markets.

#### **2.1.4 Meaning of Exchange rate**

The exchange rate is a key macroeconomic variable in the context of general economic policy making, and of economic reform programmes in particular. It is the price of one currency in terms of another. Exchange rate policy has been identified as one of the endogenous factors that can affect the economic performance of a nation (Jameela, 2010). Exchange rate is the price of one country's currency in relation to another country. It is the required amount of units of currency that can buy another amount of units of currency.

It is the price in which one currency is exchange for another. It measures the domestic worth of an economy; especially in terms of the currencies of most industrialized countries such as United States of America Dollars, British Pound Sterling, German Duetsche Mark, Japanese Yen, French Frank, Italian Lira and the Canadian Dollar (Akpan, 2004). In Nigeria, the management of the exchange rate is carried out by the central bank of Nigeria.

This price in some cases may be fixed by the government or it could perhaps be linked to something external - for example, gold. The exchange rate like any other price is fixed in a market and it is being controlled by the forces of demand and supply. The demand and supply in this context refers to how a currency (Nigerian Naira) is being traded in the foreign exchange market in contrast to the circulation

of money in the economy. A high level of demand for a currency will force its price (i.e. the exchange rate) to go up and vice versa. Where supply is equal to demand is the equilibrium exchange rate.

The demand for Naira comes from people who are investing in Nigeria from abroad and so need Naira, or from firms who are buying local products. In this case Naira will be needed to pay for the goods bought. The supply comes from people in Nigeria who are selling Naira. This may be because the payment of goods bought from overseas (imports), or it may simply be an investment in another country and so need the local currency. To get this, the Naira has to be sold in exchange for the other currency.

### **2.1.5 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.

### **2.1.6 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. 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.

### **2.1.7 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, if 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.

### **2.1.8 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. This is worked out from the amount of trade done with that country. The currency of a country that a large amount of trade is done will have a higher weight than one whom relatively little trade is done 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.

### **2.1.9 Free or pegged**

A fixed exchange rate regime is defined as the value of a currency that is pegged relative to the value of one other currency (anchor currency) so that the exchange rate is fixed in terms of the anchor



currency. 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.( Okhiria 2008). According to Cobb and Field (2008), fixed exchange rates provide the discipline needed in economic policy to prevent high inflation rates.

#### **2.1.10 Exchange Rate management in Nigeria**

The exchange rate system in Nigeria has undergone different changes since the enactment of exchange rate control in 1962, it has revolved between two regimes ; pegged and flexible regimes. The fixed exchange was in use before 1986, but since 1986 to date, the flexible exchange rate has been used with different modifications.

#### **2.1.11 Exchange rate management before 1986**

Exchange rate in Nigeria has undergone substantial transformation since the immediate post-independence era when the country operated a fixed exchange rate system up to early 1970s, and then from 1986 when a market based exchange rate system was introduced in the context of structural adjustment program. Before 1978, the Nigeria's exchange rate was consonance with the IMF par value or fixed exchange rate system, the Nigerian currency not being a traded currency had its exchange rate

largely subjected to administrative management. The exchange rate was largely passive as it was dictated by the fortunes or otherwise of the British pounds sterling or the US dollars. The Naira was pegged to the British pounds sterling up to 1967, but it changed to dollar when the pound sterling was devalued.

Following the breakdown of the IMF per value system in December 1971, the naira was adjusted in relation to dollar. In 1978, the naira was pegged to a basket of 12 currencies comprising Nigeria's major trading partners. These policies were jettisoned in 1985 in favor of quoting the Naira against the dollar. During this period, the main objectives of the exchange rate policy was

- i. To equilibrate the balance of payments of payments
- ii. To preserve the value of external reserves
- iii. To maintain a stable exchange rate. This has implication for external and internal macroeconomic adjustment and equilibrium.

Although a number of ad-hoc measures were adopted to realize the policy objectives, it can be said that the economic objectives played a major role in determining the exchange rate

Given the centrality of foreign exchange in international economic transactions especially in developing country like Nigeria, the management of scarce foreign exchange has over the years been a significant component of national economic management. Basically, there are two phases to economic management in Nigeria.

During the first phase (1970-1985), Nigeria operated a controlled exchange rate regime where exchange rate of the naira was pegged to the dollar. The second phase of exchange rate history in Nigeria began in 1986.

Following the oil glut of early 80s, it became clear that Nigerian economy which depends on oil was not able to sustain the fixed exchange regime because its foreign reserves not only depleted but foreign debt also mounted. As an integral part of the Structural Adjustment Programme introduced in 1986, the country adopted a flexible exchange rate through the Second tier Foreign Exchange Market (SFEM).

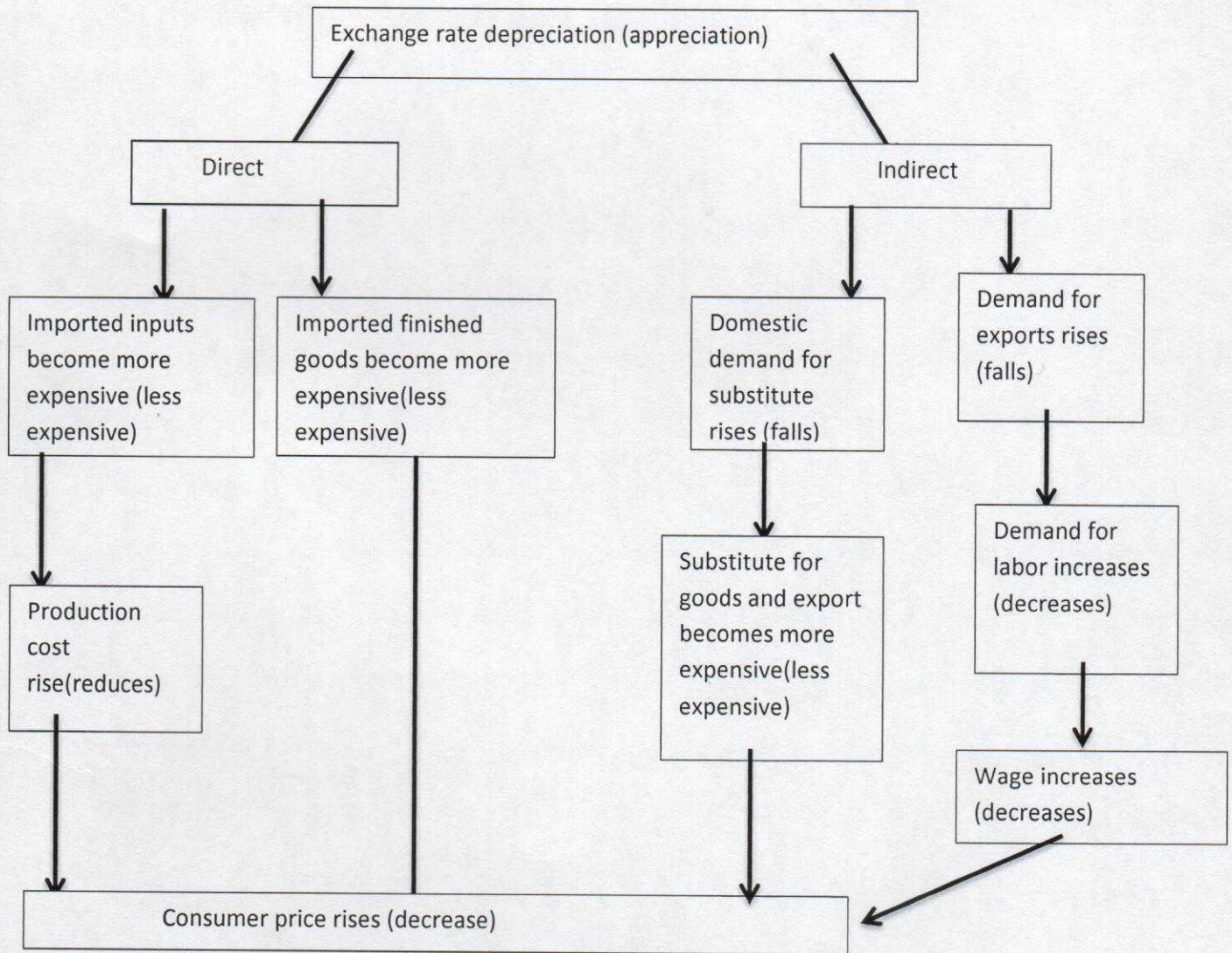
### **2.1.12 The Relationship between Exchange Rate and Inflation**

Exchange rate movements affect domestic prices directly and indirectly through its effect on aggregate supply and demand. The direct channel is due to operation of law of one price based on purchasing power parity theory (PPP). It is postulated that exchange rate between two currencies is determined by relative movements in the price levels in the two countries. PPP states that price levels between two countries are equal when expressed in the same currency at any period of time. Therefore, if PPP holds, exchange rate fluctuations translate into proportional movements in the domestic price level; i.e. pass-through is equal to one. According to Hyder and Shah, (2004), in a small open economy (an international price taker), a depreciation of the domestic currency will result in higher import prices (both for finished goods and intermediate inputs), which will ultimately be transmitted to higher domestic prices.

Exchange rate variations can also affect domestic prices through its indirect effect on aggregate demand. Depreciation of the domestic exchange rate reduces the foreign price of domestic goods and services, and thereby increases foreign demand, resulting to an increase in net exports and hence aggregate demand and real output. The increase in domestic demand and real income may bid up input prices and hence causing workers to agitate for higher wages to maintain a real wage. The nominal wage increase may result to further price increases. Furthermore, depreciation may increase the

domestic price of imported goods and services and thereby lead to expenditure switching in favor of domestic goods and services, which will increase their demands and raising domestic prices.

### Mechanism of Exchange Rate Pass-Through



Source: Okhiria(2008)

### **2.2.1 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.

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. The Monetarists were 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.

The classical theory of inflation, the Keynesian theory as well as the structural theory of inflation will be looked into in this section of the literature review.

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.

### **2.2.2 The Classical theory: The money supply**

According to the early classical economists, inflation is caused majorly because of increase in the money supply. This prescription arises from the 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 effects of changes in the monetary sector to the goods sector.

### **2.2.3 Keynesian Inflation Theory**

According to Keynesian inflation theory, 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 labor 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 oil crisis in 1973-1974 and 1970-80 resulted in many countries experiencing severe cost-push inflation.

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.

#### **2.2.4 Structural Theory of inflation**

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 where 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. It is believed that the phenomenon of inflation starts with population and income growth which both lead to growth of demand in economy. Considering 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 periods level of prices, expense are based on current prices.

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.

The model of inflation according to the structuralist can be represented below The model express inflation as a function of money supply lag one, nominal effective exchange rate lag one, oil revenue lag one and government exchange lag one.

$$I = f(M1, EX, REV, G).$$

It has been observed by researchers like Aigbonkhan (1991) and Omotor (2008) that inflation in Nigeria is affected by the following variables: exchange rate, money supply, government spending, real GDP, and inflationary expectation. Based on this relationship, a functional form of these variables on inflation in Nigeria is presented below:

Thus,

$$INFR = F (EXCR, MS, GEXP, RGDP,)$$

From equation above, Inflation depends on exchange rate, money supply, real GDP. It expected from theory that an increase in exchange rate, money supply and government spending will increase inflation. This relationship is evident in the work of Aigbonkhan (1991) and Omotor (2008). Real GDP is expected to have a negative relationship with inflation, i.e., as output of the economy increases inflation will reduce, because more goods are available in the system.

### **2.2.5 Theories of exchange rate**

There are three main theories of the determination of foreign exchange rate. They are as follows:

#### **2.2.6 The Mint Parity Theory**

This theory is associated with the working of the international gold standard. Under this system, the currency in use was made of gold or was convertible into gold at a fixed rate (Jhingan 2004). Here, the value of the currency unit was defined in terms of certain weight of gold and the Central Bank of the country concerned was always ready to buy and sell gold at the specified price. The rate at which the naira could be converted into gold is called the mint price of gold.

#### **2.2.7 The Purchasing Power Parity Theory**

This Theory states that spot exchange rate between currencies will change to the differential in inflation rate between countries. The theory states that the equilibrium exchange rate between two inconvertible paper currencies is determined by the equality of their purchasing power. That is, the exchange rate between two countries is determined by their relative price levels (Obadan, 2006).

#### **2.2.8 The Balance of Payment Theory**

This theory stipulates that under free exchange rates, the exchange rate of the currency of a country depends upon its balance of payment. According to Jhingan (2004), a favourable balance of payments raises the exchange rate, while an unfavourable balance of payments reduces the exchange rate. Thus the theory implies that the exchange rate is determined by the demand for and supply of foreign exchange.

### **2.3 EMPIRICAL EVIDENCES**

There is a vast body of empirical literature on the relationship between exchange rate and inflation rate in Nigeria. In many of the existing studies, inflation is assumed to originate from both the demand side and supply side. The supply side is captured by the tradable sector whereas the demand side is

represented by the non-tradable sectors. The price of non-traded goods responds to disequilibria in the money market and the price of traded goods is governed by the movements in the exchange rates and foreign prices. The overall price level is a weighted average of the price of tradable and non-tradable goods.

These recent theories of inflation have shifted attention away from traditional direct economic causes of inflation, such as money creation, towards political and institutional determinants of inflationary pressures. However, these theories have been criticized as they are theoretical and put emphasis almost exclusively on industrial countries.

Several studies have been conducted examining the impact of exchange rate on inflation. A review of these empirical studies from the viewpoint of developed, developing countries and Nigeria are briefly exposed.

Bakoulas, et al., (2002) examined the impact of exchange rate fluctuations on the volume and variability of trade flows and they concluded that exchange rate volatility discourages expansion of volume of trade thereby reducing its benefits. Eichengreen and Lablang, (2003) carried out a research on twelve countries over a period of 120 years and found strong inverse relationship between exchange rate stability and economic growth. They concluded that the results of each estimates strongly depend on time period and the sample. David et. al., (2010) examined the effects of exchange rate fluctuations on the Nigerian manufacturing industries. They employed a multiple econometric tools which revealed a negative relationship between exchange rate volatility and the manufacturing performance.

The dominant view in the literature about the impact of exchange rate on inflation is that pegged exchange rate period is seen as an important anti-inflationary tool for monetary policy makers. Romer (1993) states that fixed rates are able to reduce inflation due to its role as a mechanism for monetary

authorities. Similarly, in their book, Cobb and Field (2008) indicate that fixed regimes are **needed to** provide such effects to monetary policies when a country struggles with high inflation rates.

Furthermore, Yeyati and Sturzenegger (2001) study impact of the currency policies on inflation. Their paper covered data over time period 1974-1999. Based on their findings for developing countries, pegged regimes (only the ones lasting five or more years) have lower inflation rates compared to countries under flexible regimes with the cost of slower growth. In addition, Abbott and De Vita (2011) investigated the trade-off between inflation and growth under an alternative exchange rate by using a de facto classification regime over time period 1980-2004. The authors' findings show that fixed regimes are associated with lower inflation rates, compared to flexible and intermediate regimes. Akinbobola (2012) in his paper, the dynamics of money supply, exchange rate and inflation rates in Nigeria using Vector Error Correction Mechanism (VECM) confirms that in the long run, money supply and exchange rate have significant inverse effects on inflationary pressure, while real output growth and foreign price changes have direct effects on inflationary pressure. The possible justification for the inverse effect of money supply on price level is that inflation may not be due to aggregate demand pressure but rather due to hiccups in the supply chain of goods both from the domestic and foreign supply outlets.

Empirical deductions also signify the presence of significant feedback from the long run to short run disequilibrium. However, there exists a causal linkage between inflation, money supply and exchange rate in Nigeria.

Kamin and Khan (2003) empirically investigated the multi-country comparison of the linkages between inflation and exchange rate competitiveness found that a relationship exists between inflation rate and the RER in most Asian and Latin American countries. Their study further revealed that the influence of

exchange rate changes on inflation rate is higher in Latin American countries than those in Asia and industrialized countries.

Omotor, (2008) in his study of exchange rate reforms and its inflationary consequences, found, using annual time series data covering the period of 1970 to 2003, that exchange rate policy reforms is important in the determination of inflation in Nigeria.

Holod (2000) explores the identified vector autoregression to model the relationship between CPI, money supply and exchange rate in Ukraine. The results show that exchange rate shocks significantly influence price level behaviour.

Clemens and Alex (2002) empirically estimate and test the relationship between exchange rate accommodation and the degree of inflation persistence using a non-linear autoregressive inflation equation for ten European countries for the period 1974:1-1998:2. In the estimation procedure they allow for the presence of an unknown number of shifts in the mean of inflation. Their results provide supportive evidence for the existence of a positive link between exchange rate accommodation and inflation persistence for most of the smaller and more dependent exchange rate mechanism (ERM) countries, even when mean level shifts in inflation are appropriately accounted for. For the larger countries and the countries that remained outside the ERM for most of the period they find hardly any evidence of such positive link. Overall, their results provide modest support for the existence of the theoretically hypothesized positive link between exchange rate accommodation and inflation persistence.

Oriavwote and Eshenake investigated the empirical assessment if real exchange rate and inflation in Nigeria using data covering the period between 1970 and 2010, the cointegration test result shows a long run relationship between inflation and the real exchange rate. The satisfactory speed of adjustment indicated by the error correction model further supports this long run relationship. The result showed

that both domestic and imported inflation appreciated the real exchange rate. The ARCH result indicates the persistence of volatility between the rate of inflation and the real exchange rate, an indication that the real exchange rate in Nigeria has been susceptible to fluctuations in the rate of inflation.

Ndugu (1997) investigated price and exchange rate dynamics in Kenya using data covering the period between 1970 and 1993. Using the Granger causality testing he found that the level of domestic inflation and exchange rate affect each other

Contrarily, Shagufta(2012) examined the relationship between Exchange Rate and Inflation rate in Pakistan using data covering 1970-2010 discovered a negative relationship between Exchange rate of the US dollar and Pakistan rupee and the inflation rate using the correlation matrix.

Abu Bakarr et al (2012), examines the effect of changes in the exchange rate on output growth and inflation in the WAMZ economies from an open-economy general equilibrium model which highlights the interrelationships among real GDP growth, inflation, exchange rate depreciation/ appreciation and money supply growth. Employing quarterly data series for the period 1981Q1 to 2010Q4 for all countries except Ghana (1983Q2 to 2010Q4) and Guinea (1989Q1 to 2010Q4), using the vector autoregressive (VAR) model to estimate the impulse response functions and variance decompositions for inflation and output in order to determine how inflation and output respond to changes in the exchange rate, and what proportion of inflation and output variance can be explained by the exchange rate.

The results of the study suggest that exchange rate had significant impact on inflation in all the Member States. The results reveal a negative relationship between real exchange rate and real GDP growth for both Liberia and Sierra Leone, implying that depreciation of the real exchange rates in these countries could lead to output growth. However, the impact of exchange rates on output in The Gambia, Ghana,



Guinea and Nigeria though positive, remained weak, which may be partly due to supply side factors as evident from the results. They conclude that real exchange rate depreciation generates inflationary pressures and impact significantly on output growth. In addition, inflation and growth in the WAMZ are partly driven by structural factors.

Kamin and Roger (2000) examined the impact of depreciation on output and inflation in Mexico employing VAR model with four variables; real exchange rate, output, price index and US interest rate using quarterly data for the period 1981-1995. The result revealed depreciation shock leads to reduction in output and an increase in inflation.

Loungani and Swagel (2001) using a panel of 53 developing countries: African countries – 16, Asian – 11, South American – 19, and Mediterranean – 7 revealed that in developing countries with the floating exchange rate, the impact of exchange rate depreciation on the price changes is positive and statistically significant. The same results are obtained in the studies estimating the relationship between the exchange rate and inflation separately for individual developing countries.

Carrera and Vuletin (2003) seek to analyze the relationship between exchange rate regimes and short term volatility of the effective real exchange rate. They tried to set out the relative importance of these links specifically by analyzing the exchange rate regimen influence on real exchange rate (RER) volatility using a dynamic panel date analysis. A sample of 92 countries for the period 1980-1999 was considered. The study revealed that other variables influences real exchange rate (RER) volatility and it also analyzed the persistence of shocks in real exchange rate (RER). The study further found evidence of more openness, acceleration in per capita Gross Domestic Product (GPD) growth, reduction and volatility. Evidence from the study also supports the view that the analysis of the dynamics of the exchange rate regime needs to differentiate between developing and developed countries.

Benita and Lauterbach (2007) studied the daily volatility of exchange rate between the United States of America dollar and 43 other currencies in 1990-2001. This study used several macroeconomic variables to proxy for the domestic economy uncertainty, wealth and openness to international markets as controls in the analysis. The main findings of the study were that exchange rate volatility was positively correlated with real domestic interest rate and with the degree of the central bank intervention. In the panel, the study finds positive correlation between exchange rate volatility, real interest rates and the intensity of the central bank intervention.

Akpokodje (2009) explored the export and import effect of exchange rate volatility with specific reference to the non-communate Finnciere Africaine (Non-CFA) countries of Africa during the period 1986-2006. The study revealed a negative effect of exchange rate volatility on exports and imports in the selected African countries.

The adverse effect of the exchange rate volatility in the sample countries found in the study suggests the need for policy interventions that will help minimize and where possible eradicate exchange rate volatility. Also Yinusa (2008) investigated the relationship between nominal exchange rate volatility and dollarization in Nigeria by applying Granger Causality Test for the period 1986-2003 using quarterly data. The study reported a bi-causality between them but the causality from dollarization to exchange rate volatility appears stronger and dominant. He however, concluded that policies that aim to reduce exchange rate volatility in Nigeria measures that specifically address the issue of dollarization. But the exact measure of exchange rate volatility in the study was not reported.

It is observed that there is no perfect agreement on the totality of factors that cause inflation in developing countries including Nigeria. This study using Multiple Regression will concentrate of finding of effects of exchange rate on inflation

## CHAPTER THREE

### RESEARCH METHODOLOGY

#### 3.1 Sources and methods of data collection

Secondary data were used for the study. They were second from the various annual reports of the Central Bank of Nigeria.

The data covered 34 years from year 1980 to year 2014 of the dependent variable inflation rate and the independent variables (exchange rate, money supply, GDP growth rate, government revenue) representing economic indicators affecting the economic growth of Nigeria.

#### 3.2 Model specification

Specification of econometric model is based on economic theory and on any valuable information relating to the phenomenon being studied.

In order word to test the working hypothesis, there is need to specify the appropriate relationship between the dependent and independent variables. This is because it is the relationship of economic theory which can be measured with one or other econometric techniques as casual, that is they are in relationship in which some variables are postulated to be causes of the variables of the other variables thus, the relationship between inflation and exchange rate is as follows

$$INF = F (MS, EXCR GEXP, GDPgrowth rate) \dots \dots \dots (1)$$

This is given,

I = Inflation

MI = Money supply

G = Government Expenditure

EX. = Exchange rate

GDP growth= GDP growth rate

1. Statistical criteria: First order test

The theories of statistic prescribe some test of finding out how accurate the parameter estimates of a model are, these test help to suggest whether or not the parameter estimates of the model. It will tell us whether it's a good fit or not

Such statistical criteria tests are:

T tests: The co-efficient of the model will be tested for significance using the t- test. The T testing procedure is based on the assumption that the error term  $U_i$  follows the normal distribution.

F test: The F test will be used to test the overall significance of the model

Durbin- Watson test: to test the validity of the assumptions of non-autocorrelated disturbances, an econometric technique known as the Durbin – Watson will be computed.

2. Econometric criteria: second order test

These are set by the theory of econometrics and are aimed at investigating whether the assumptions of the econometric method employed are satisfied or not. Thus, the assumptions of OLS will be investigated.

## CHAPTER FOUR

### DATA PRESENTATION AND DATA ANALYSIS

#### 4.1 Data Presentation

#### 4.2 Data Analysis

This section presents the results of the estimation carried out to analyze the impact of exchange rate on inflation rate and to identify the major causes of inflation rate in Nigeria in line with the methodology of the study. It also discusses these results and their interpretation.

##### 4.2.1 Unit Root Test

Before estimating the model specified in the previous chapter, we first test the stationarity properties of our variables. Table 1 below presents the unit root results of our variables.

The unit root test is used to determine if the time series variables under observation are stationary or not. This is because most time series data sets are often found not to be stationary and estimation with such data produces a spurious result.

Various methods are often used to test for stationarity of variables, they include Dickey-Fuller (1979 & 1981), Augmented Dickey-Fuller (1979), GLS Detrended Dickey-Fuller (GLS-DF, 1996), Phillips-Perron (1998), Kwiatkowski-Phillips-Schmidt-Shin (KPSS, 1992), Ng-Perron (2001) among others. However, this study will employ the Augmented Dickey-Fuller (ADF) unit root test to test for non-stationarity or otherwise of the variables.

**Table 1: Augmented Dickey Fuller(ADF) unit root test**

Variables	At Level	p-value	First difference	p-value
Exchange Rate	Not Stationary	0.9362	Stationary	0.0004
Inflation	Stationary	0.0086		
Government Expenditure	Not Stationary	0.0557	Stationary	0.0000
GDP Growth	Stationary	0.0013		
Money Growth	Stationary	0.0000		
Residual	Stationary	0.0039		

Source: Author's computation with Eviews 7.2

*Note: A variable is stationary when the ADF t-stat is greater than the critical values at a given level of significance. \* and \*\* signifies stationarity at 1 percent and 5 percent level of significance.*

The unit root table shows that shows only three of the variables are stationary at level and two of the variables become stationary after first difference. The inflation rate, GDP growth and money growth are stationary at level. Exchange rate and government expenditure are not stationary at level, however they become stationary at first difference. Next is to test if there is a long run relationship among the variables. That is, we need to test if all the variables cointegrate in the long run. The last row on table one shows that the residual is stationary at level. Thus we reject the null hypothesis of the cointegration and accept the alternative hypothesis. Therefore, the

Constant	32.20675	2.730771	0.0108
F-test = 1.425628, Durbin Watson = 0.992088, R-squared = 0.238			

Source: Authors computation from E-views 7.2

Table 2 provides the long run relationship among variables. The coefficient of exchange rate is negative and significant at 10 percent. This implies that there is a negative relationship between inflation and exchange rate in the long run. This means that a 1 naira depreciation of the exchange rate will lead to 0.13% reduction in the inflation rate. This result seems to be against theory.

GDP growth is positive and significant at 5 percent. A one percent increase in growth will push up inflation by 0.24 percent. This result conforms to theory because an increase in growth will place an upward pressure on prices, therefore leading to an increase in inflation in the long run.

The coefficient of government expenditure is negative but insignificant at all standard levels of significance.

Also, the coefficient of money growth is positive and insignificant.

The constant term or intercept of the regression is positive and significant.

The Durbin-Watson statistic 0.993 in table 2 is observed to be higher than  $R^2$  indicating that the model is non-spurious.

#### 4.2.3 Error Correction Model (ECM).

The error correction mechanism was first used by Sargan (1962) and later popularized by Engle and Granger (1987) to correct for disequilibrium in a co-integrating relationship. The error

correction mechanism serves as a means of reconciling short run disequilibrium behavior of an economic variable with its long run behavior (Sule and Momoh, 2009). The two criteria in the use of the error correction model are the coefficients and the t-statistics. The coefficients are expected to be negatively signed showing a convergence of the variables back to equilibrium path following every period of disequilibrium. The t-stat on the other hand is used to check the significance of the variable and the absolute value of the t-stat must at least be zero.

**Table 3: Error correction model (ECM)**

Variables	Coefficient	t- value	Probability-value
D(Exchange rate)	-0.029960	-2.113956	0.0102
D(GDP growth)	0.096945	2.310547	0.0587
D(Government expenditure)	0.045535	0.045534	0.9640
D(Money Growth)	-0.003369	-0.298008	0.7682
Error(-1)	-0.489022	-2.785967	0.0100
Constant	-0.210618	-0.066568	0.9475

Source: Author's computation from e-viewa 7.2

Table 3 presents the error correction model (ECM) that shows the short run relationship among the variables. The coefficient of the exchange rate is negative and significant at 5 percent level of significance. This result is similar to the one obtained before. This analysis shows that one naira depreciation will result in a 0.02% reduction in the inflation rate in the short run. This result is again surprising because theoretically, an exchange rate depreciation will lead to an increase in domestic price level and hence, inflation.



The error correction component of the model is Error (-1). Its coefficient is negative and significant as expected. Its coefficient shows that 48.9% of the discrepancy between the long run and short run value of the exchange rate is corrected in the current period. Alternatively, we can say that the speed of adjustment from the short run value of the exchange rate to its long run value is 0.489. This implies that it takes about two years for the error component to be corrected.

The short run coefficient of GDP growth is positive and significant. This implies that a 1% increase in GDP growth will result in a 0.09% increase in inflation rate. The short run coefficients of money growth and government expenditure are positive, but insignificant.

### **4.3 Discussion of Findings**

This study investigates the impact of exchange rate on inflation rate in Nigeria the discussions of findings will be explained below;

#### **4.3.1 Money Supply**

From the findings, there is a positive relationship between Money supply (MS2) and inflation rate (INFL). The coefficient of money supply is 1.12 which implies that a unit change in the money supply will cause 1.12 unit change in Inflation rate. This conforms to economic theory and according to Bakare (2011), who conducted a study on the determinants of money supply growth and its implications on inflation in Nigeria. He employed quasi-experimental research design approach. The results showed that credit expansion to the private sector determines money supply growth and inflation in Nigeria. He therefore concluded that changes in money supply are concomitant to inflation in Nigeria.

### **4.3.2 Exchange Rate**

There is a negative relationship between Exchange Rate (EXCR) and Inflation Rate (INFL), from the findings the coefficient of Exchange Rate  $-0.13$  which implies that a 1aira depreciation of Exchange rate will lead to a  $-0.13$  reduction in Inflation rate. This does not conform to economic theory which says that there exist a positive relationship between inflation rate and exchange rate such that as exchange rate rises, inflation rate rises even faster.

### **4.3.3 Government Expenditure**

According to the result of the findings, Inflation rate and government expenditure has a negative relationship, but it was found that it is insignificant at all standard level of significance. This implies that an increase in government expenditure will decrease the inflation rate.

### **4.3.4 GDP Growth Rate**

From the findings, the GDP growth rate and inflation rate has a positive relationship which conforms to theory which says that, an increase in the GDP will also increase the Inflation rate, the findings reveals that a 1% increase in the GDP will push inflation rate up by 0.24%.

### **4.3.5 Summary of Apriori sign**

From the results obtained in the analysis of the data, the result is expected to follow the economic aprior expectation of magnitude and sign. Thus, table below shows the outcome of the signs of the parameters and expected signs.

Variable	Expected	Obtained	Conclusion
Money Supply	Positive	Positive	Conforms
Exchange Rate	Positive	Negative	Does not conform
Government Expenditure	Positive	Negative	Does not conform
GDP growth rate	Positive	Positive	Conforms

Source : Author

## CHAPTER FIVE

### SUMMARY OF FINDINGS, RECOMMENDATION AND CONCLUSION

#### 5.1 Summary of findings

The study examined the impact of exchange rate on Inflation rate in the Nigerian Economy over the period of 1980-2014. The study employs ordinary least square method of estimation using e-views 7.2 statistical package for the analysis.

The findings of this study show that exchange rate has a negative impact on inflation rate in the Nigerian Economy. This relationship, although does not conform to economic theory, some factors such as structural rigidities and distortions of the government can lead to the negative relationship of Inflation and Rate and exchange rate because oftentimes, the government does not allow the structural rigidities work on their own. Another reason that could be the cause of the negativity in the relationship between exchange rate and inflation is the existence of weak financial institutions that cannot effectively control the movement of the exchange rate. The subject of nominal exchange rate and prices within the year could also be a factor causing the negative relationship between exchange rate and inflation rate.

From the result of the findings, all the variables in the model except the government expenditure and the money supply proved significant even the care variable (Exchange rate).

#### 5.2 Conclusion

The study using modern econometric method shows that Inflation rate and Exchange rate has a negative relationship both in the long run and the short run, it is also seen that even though the impact of exchange rate is negative, it is stronger than any of the other factors considered in this study, The reason may not be far-fetched because since the introduction of Structural Adjustment

Programmes (SAP) and market oriented exchange rates through SFEM in 1986, inflation has become intractable and nightmarish to subsequent Nigerian governments. It was also seen in this study that the other independent variables used in this study are related to inflation rate in various degrees. This study supports the work of Umeora(2010), The Effects of Money supply and Inflation rate in Nigeria.

Conclusively, the Durbin-watson statistic 0.993 in table 2 is observed to be higher than the  $R^2$  indicating that the model is meaningful. The Durbin-watson statistics is very high indication that there is no presence of autocorrelation. The  $R^2$  0.238 shows that the variables considered in this study explains only 23% causes of inflation. Therefore, we recommend that further study should be carried out to determine the impact of other possible factors such as government deficit financing, rising lending interest rates of commercial banks, importation and other structural factors that can impact inflation in the Nigerian Economy

### **5.3 Recommendation**

From the findings and the careful investigation of the impact of exchange rate on inflation rate in the Nigerian Economy, it is therefore important to make the following policy recommendations to the Government and all the agencies in charge of Exchange rate and all the independent variables considered in this study.

1. The existing exchange rate management frameworks and structure in Nigeria should be improved upon, such that the government will allow this structures work on their own.
2. The financial institutions and other institutions in charge of the Exchange rate management in Nigeria should be strengthened to address the recurrent issues so that the benefit associated with exchange rate stability and inflation rate can be experienced in the Nigerian Economy.

3. The Government of Nigeria should try to be more serious with its economic reforms like NEEDs.

4. The Nigerian government should channel its public expenditure to the development of local industries so as to reduce inflation rate to the barest minimum level.

5. Policy makers should continue to introduce measures to control money supply, exchange rates and other factors causing inflation. Prolonged effects of inflation on an economy are not palatable although small measure of it is necessary to fight unemployment a-la-Philips Curve.

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## APPENDIX

### APPENDIX ONE

years	Inflation Rate	Money Supply	Exchange Rate	Govermemnt Expenditure	GDP Growth Rate
1980	10	15100	0.5445		4.204831
1981	20.8	16161.7	0.6369	14.7	-13.1279
1982	7.7	18093.6	0.6702	15.7	-1.05319
1983	23.2	20879.1	0.7486	15.3	-5.05045
1984	17.8	23370	0.8083	13.2	-2.02154
1985	7.4	27389.8	0.9996	12.7	8.32283
1986	5.7	33667.4	3.3166	12.6	-8.75418
1987	11.3	45446.9	4.1916	7.2	-10.7517
1988	54.5	47055	5.353	7.6	7.542522
1989	50.5	68662.5	7.65	5.4	6.467191
1990	7.4	87499.8	9.0001	5	12.76601
1991	13	129085.5	9.7545	4.8	-0.61785
1992	44.6	198479.2	9.7545	6	0.433725
1993	57.2	266944.9	22.6309	6.5	2.090378
1994	57	318763.5	21.8861	17.9	0.909763
1995	72.8	370333.5	21.8861	12.1	-0.30747
1996	29.3	429731.3	21.8861	10	4.993706
1997	8.5	525637.8	21.8861	13	2.802256
1998	10	699733.7	21.886	14	2.71564
1999	6.6	103607.5	92.5284	7	0.474238
2000	6.9	1315869	109.55	8.3	5.318093
2001	18.9	1599495	112.4864	8.2	4.411065
2002	12.9	1985192	126.4	6.7	3.784648
2003	14	2263588	135.4067	5.2	10.35418
2004	15	2814846	132.67	6.7	33.73578
2005	17.9	4027902	130.4	6.8	3.444667
2006	8.2	5832489	128.27	6.9	8.210965
2007	5.4	9166835	117.968	10.2	6.828398
2008	11.6	10780627	130.75	11.6	6.270264
2009	11.5	11525530	147.6	13	6.934416
2010	13.7	13303495	148.67	8.7	7.839739
2011	10.8	15643210	156.2	8.5	4.887387
2012	12.2	16.8	157.5	8.2	4.279277
2013	8.5	13.2	157.31	8.1	5.394416

2014	8.1		158.5526		6.309718
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## APPENDIX TWO

Null Hypothesis: MG has a unit root  
 Exogenous: Constant  
 Lag Length: 0 (Automatic - based on SIC, maxlag=8)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-6.119448	0.0000
Test critical values:		
1% level	-3.653730	
5% level	-2.957110	
10% level	-2.617434	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(MG)  
 Method: Least Squares  
 Date: 07/16/15 Time: 18:04  
 Sample (adjusted): 1981 2012  
 Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MG(-1)	-1.111720	0.181670	-6.119448	0.0000
C	58.61042	38.14088	1.536682	0.1349
R-squared	0.555211	Mean dependent var		-0.889366
Adjusted R-squared	0.540384	S.D. dependent var		307.7352
S.E. of regression	208.6290	Akaike info criterion		13.57945
Sum squared resid	1305781.	Schwarz criterion		13.67106
Log likelihood	-215.2713	Hannan-Quinn criter.		13.60982
F-statistic	37.44764	Durbin-Watson stat		2.001400
Prob(F-statistic)	0.000001			

Null Hypothesis: EXC has a unit root  
 Exogenous: Constant  
 Lag Length: 0 (Automatic - based on SIC, maxlag=8)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-0.144945	0.9362
Test critical values:		
1% level	-3.639407	
5% level	-2.951125	
10% level	-2.614300	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(EXC)

Method: Least Squares

Date: 07/16/15 Time: 18:09

Sample (adjusted): 1981 2014

Included observations: 34 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXC(-1)	-0.005289	0.036489	-0.144945	0.8857
C	4.984735	3.256121	1.530881	0.1356
R-squared	0.000656	Mean dependent var		4.647298
Adjusted R-squared	-0.030573	S.D. dependent var		13.07600
S.E. of regression	13.27438	Akaike info criterion		8.066571
Sum squared resid	5638.694	Schwarz criterion		8.156357
Log likelihood	-135.1317	Hannan-Quinn criter.		8.097191
F-statistic	0.021009	Durbin-Watson stat		1.703853
Prob(F-statistic)	0.885663			

Null Hypothesis: D(EXC) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=8)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.832775	0.0004
Test critical values:		
1% level	-3.646342	
5% level	-2.954021	
10% level	-2.615817	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(EXC,2)

Method: Least Squares

Date: 07/16/15 Time: 18:11

Sample (adjusted): 1982 2014

Included observations: 33 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EXC(-1))	-0.858527	0.177647	-4.832775	0.0000
C	4.113263	2.469142	1.665867	0.1058
R-squared	0.429683	Mean dependent var		0.034856
Adjusted R-squared	0.411285	S.D. dependent var		17.37308
S.E. of regression	13.32997	Akaike info criterion		8.076598
Sum squared resid	5508.329	Schwarz criterion		8.167296
Log likelihood	-131.2639	Hannan-Quinn criter.		8.107115
F-statistic	23.35572	Durbin-Watson stat		1.977648
Prob(F-statistic)	0.000035			

Null Hypothesis: INFL has a unit root  
 Exogenous: Constant  
 Lag Length: 0 (Automatic - based on SIC, maxlag=8)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.801769	0.0686
Test critical values:		
1% level	-3.639407	
5% level	-2.951125	
10% level	-2.614300	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(INFL)  
 Method: Least Squares  
 Date: 07/16/15 Time: 18:12  
 Sample (adjusted): 1981 2014  
 Included observations: 34 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFL(-1)	-0.395904	0.141305	-2.801769	0.0086
C	7.894802	3.792511	2.081682	0.0455
R-squared	0.196987	Mean dependent var		-0.055882
Adjusted R-squared	0.171893	S.D. dependent var		16.12172
S.E. of regression	14.67083	Akaike info criterion		8.266622
Sum squared resid	6887.462	Schwarz criterion		8.356408
Log likelihood	-138.5326	Hannan-Quinn criter.		8.297241
F-statistic	7.849910	Durbin-Watson stat		1.633449
Prob(F-statistic)	0.008555			

Null Hypothesis: GDPG has a unit root  
 Exogenous: Constant  
 Lag Length: 0 (Automatic - based on SIC, maxlag=8)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.427947	0.0013
Test critical values:		
1% level	-3.639407	
5% level	-2.951125	
10% level	-2.614300	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(GDPG)  
 Method: Least Squares  
 Date: 07/16/15 Time: 18:17

Sample (adjusted): 1981 2014  
 Included observations: 34 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDPG(-1)	-0.761523	0.171981	-4.427947	0.0001
C	2.833230	1.458001	1.943229	0.0608
R-squared	0.379926	Mean dependent var		0.061908
Adjusted R-squared	0.360548	S.D. dependent var		9.602113
S.E. of regression	7.678399	Akaike info criterion		6.971722
Sum squared resid	1886.650	Schwarz criterion		7.061508
Log likelihood	-116.5193	Hannan-Quinn criter.		7.002341
F-statistic	19.60671	Durbin-Watson stat		1.869495
Prob(F-statistic)	0.000104			

Dependent Variable: INFL  
 Method: Least Squares  
 Date: 07/16/15 Time: 18:20  
 Sample (adjusted): 1981 2012  
 Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXC	-0.131738	0.060487	-2.177951	0.0383
GDPG	0.207711	0.484786	0.428459	0.6717
GEXPEND	-0.516383	0.998334	-0.517244	0.6092
MG	-0.009421	0.016058	-0.586673	0.5623
C	33.79231	11.85460	2.850566	0.0083
R-squared	0.168342	Mean dependent var		20.75938
Adjusted R-squared	0.045133	S.D. dependent var		18.42939
S.E. of regression	18.00870	Akaike info criterion		8.762188
Sum squared resid	8756.460	Schwarz criterion		8.991209
Log likelihood	-135.1950	Hannan-Quinn criter.		8.838102
F-statistic	1.366315	Durbin-Watson stat		1.027725
Prob(F-statistic)	0.271738			

Null Hypothesis: ERROR has a unit root  
 Exogenous: Constant  
 Lag Length: 1 (Automatic - based on SIC, maxlag=7)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.054961	0.0039
Test critical values:		
1% level	-3.670170	
5% level	-2.963972	
10% level	-2.621007	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(ERROR)  
 Method: Least Squares  
 Date: 07/16/15 Time: 18:23  
 Sample (adjusted): 1983 2012  
 Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ERROR(-1)	-0.714015	0.176084	-4.054961	0.0004
D(ERROR(-1))	0.379761	0.173632	2.187160	0.0376
C	0.633754	2.591840	0.244519	0.8087
R-squared	0.378829	Mean dependent var		0.661100
Adjusted R-squared	0.332816	S.D. dependent var		17.37960
S.E. of regression	14.19589	Akaike info criterion		8.238421
Sum squared resid	5441.128	Schwarz criterion		8.378541
Log likelihood	-120.5763	Hannan-Quinn criter.		8.283247
F-statistic	8.233147	Durbin-Watson stat		1.898650
Prob(F-statistic)	0.001616			

Null Hypothesis: GEXPEND has a unit root  
 Exogenous: Constant  
 Lag Length: 0 (Automatic - based on SIC, maxlag=8)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.906235	0.0557
Test critical values:		
1% level	-3.653730	
5% level	-2.957110	
10% level	-2.617434	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(GEXPEND)  
 Method: Least Squares  
 Date: 07/18/15 Time: 07:30  
 Sample (adjusted): 1982 2013  
 Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GEXPEND(-1)	-0.407642	0.140265	-2.906235	0.0068
C	3.738965	1.447179	2.583623	0.0149
R-squared	0.219689	Mean dependent var		-0.206250
Adjusted R-squared	0.193678	S.D. dependent var		3.159414
S.E. of regression	2.837008	Akaike info criterion		4.983839
Sum squared resid	241.4585	Schwarz criterion		5.075447
Log likelihood	-77.74142	Hannan-Quinn criter.		5.014204
F-statistic	8.446202	Durbin-Watson stat		2.054874
Prob(F-statistic)	0.006814			

Null Hypothesis: D(GEXPEND) has a unit root  
 Exogenous: Constant  
 Lag Length: 0 (Automatic - based on SIC, maxlag=8)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-6.724083	0.0000
Test critical values:		
1% level	-3.661661	
5% level	-2.960411	
10% level	-2.619160	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(GEXPEND,2)  
 Method: Least Squares  
 Date: 07/18/15 Time: 07:32  
 Sample (adjusted): 1983 2013  
 Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GEXPEND(-1))	-1.216056	0.180851	-6.724083	0.0000
C	-0.290463	0.572629	-0.507245	0.6158
R-squared	0.609234	Mean dependent var		-0.035484
Adjusted R-squared	0.595760	S.D. dependent var		5.003569
S.E. of regression	3.181263	Akaike info criterion		5.214775
Sum squared resid	293.4927	Schwarz criterion		5.307290
Log likelihood	-78.82901	Hannan-Quinn criter.		5.244932
F-statistic	45.21329	Durbin-Watson stat		2.087662
Prob(F-statistic)	0.000000			

Dependent Variable: INFL  
 Method: Least Squares  
 Date: 07/17/15 Time: 21:55  
 Sample (adjusted): 1981 2013  
 Included observations: 33 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXC	-0.134924	0.074554	-1.809751	0.0811
GDPG	0.248211	0.472268	2.475572	0.0133
GEXPEND	-0.402856	0.998060	-0.403639	0.6895
M2G	1.12E-08	9.69E-07	0.011605	0.9908
C	32.20675	11.79402	2.730771	0.0108
R-squared	0.169201	Mean dependent var		20.38788
Adjusted R-squared	0.050516	S.D. dependent var		18.26425
S.E. of regression	17.79696	Akaike info criterion		8.734659



Sum squared resid	8868.488	Schwarz criterion	8.961403
Log likelihood	-139.1219	Hannan-Quinn criter.	8.810952
F-statistic	1.425628	Durbin-Watson stat	0.992088
Prob(F-statistic)	0.251431		

Dependent Variable: D(INFL)  
Method: Least Squares  
Date: 07/17/15 Time: 22:13  
Sample (adjusted): 1982 2012  
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EXC)	-0.029960	0.262910	-2.113956	0.0102
D(GDPG)	0.096945	0.312176	2.310547	0.0587
D(GEXPEND)	0.045535	1.000017	0.045534	0.9640
D(MG)	-0.003369	0.011306	-0.298008	0.7682
ERROR(-1)	-0.489022	0.175530	-2.785967	0.0100
C	-0.210618	3.163929	-0.066568	0.9475
R-squared	0.238594	Mean dependent var	-0.277419	
Adjusted R-squared	0.086313	S.D. dependent var	16.77722	
S.E. of regression	16.03684	Akaike info criterion	8.559640	
Sum squared resid	6429.505	Schwarz criterion	8.837185	
Log likelihood	-126.6744	Hannan-Quinn criter.	8.650113	
F-statistic	1.566799	Durbin-Watson stat	1.617926	
Prob(F-statistic)	0.205813			