• permanent disability		RM500,000
• illness or bodily injury		RM500,000
• disability income		RM10,000
• medical expenses		100%
Refundable prepaid premiums		100%

Source: www.pidm.gov.my

Table 3: Premium Rate and Assessment Base of PIDM

Rating	Life Insurance	General Insurance	Family Takaful	General Takaful
1	0.25%	0.05%	0.06%	0.25%
2	0.05%	0.1%		
3	0.1%	0.2%		
4	0.2%	0.4%		

	Life Insurance/Family Takaful	General Insurance / General Takaful
Assessment Base	"Total Actuarial Valuation Liabilities" as at 31 December of preceding assessment year	Total net premiums received during preceding assessment year

Source: www.dic.go.jp

Table 4: Target Fund System of KDIC

Target Reserves	Banks	Investment Traders and Brokers	Life-insurers	Non-life Insurers	Merchant Banks	Mutual Savings Banks
Lower Limit	0.825%	0.825%	0.660%	0.825%	Deferred	1.650%
Upper Limit	1.100%	1.100%	0.935%	1.100%		1.925%

Source: www.kdic.kr

MONEY SUPPLY GROWTH AND ITS INFLATIONARY EFFECTS IN NIGERIA

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ABSTRACT

This study examines the relationship between money supply growth and inflation in Nigeria using time series data for the period of thirty-three years (1980-2012). In analyzing the data both ordinary least square (OLS) regression method and Autoregressive distributed lag (ARDL) bound F-test for co integration were used. Variables for this study are (inflation, money supply growth M1& M2, interest rate, exchange rate and fiscal deficit). The OLS result indicates narrow money supply growth M1, interest rate and fiscal deficit are positively related to inflation. While broad money supply growth M2 and exchange were negatively related to inflation. Bound F-test for co-integration result indicates that there is an evidence of long run relationship between money supply growths when inflation is used as dependent variable. However granger causality result revealed that there is a unidirectional causality running from money supply growth to inflation in Nigeria which is in tandem with classical quantity theory assertion. Finally, the study recommends a long term stabilization of monetary policy instrument especially the open market operation (OMO) and the need for government to reduce its deficit financing.

KEYWORDS: ARDL, Co- integration, Inflation, Money Supply Growth and Granger Causality

1. Background to the Study

Inflation is one of the most notorious macroeconomic variables that are challenging the economies of many nations across the globe. It is a phenomenon associated with persistent

and appreciable rise in general level of price in an economy (Jhinghan, 2002). Many economists argue that inflation is strictly a monetary phenomenon and that inflation occurs when the rate of growth of the money supply is higher than the growth rate of the economy (Akcay*et al.*1996). This phenomenon is well pronounced especially in developing nations of Africa including Nigeria.

According to Oladipo and Akinbobolo (2013), an annual inflation rate in some African countries averaged more than 15 percent, with some countries experiencing rates of 20 percent or more. While prices have had an upward trend in some of these countries, the price instability is yet to reach the hyperinflation conditions once experienced in some Latin American countries. In addition, some of the reasons adduced for the sustained and persistent inflation rates in many developing countries include: high public sector budget deficits, monetization of public sector budget deficits, high military expenditure, inadequate rainfall, populist policies especially prior to elections, persistent inflationary expectations of economic agents; increase in money supply; increases in imported raw materials, inputs, and manufactured, rising interest rates resulting from the crowding-out effect of government borrowing and unstable exchange rates before and since the adoption of IMF/World Bank adjustment programs. Kumpayi, et al. (2012) observed that, high inflation in Nigeria has caused yield on investment to decline while government policy objectives is adversely affected as the real size of its budget shrinks with rising inflation which has hampered economic growth.

The causes of inflation are controversial. Various economists and finance experts give different factors as the causative agents. They opine that some of the factors: money supply, exchange rates, interest rates, government deficit budget and a host of others – are largely responsible for inflation plaguing, in various degrees of different parts of the world. Developing countries appear worst hit by the ravages of inflation (Emmanuel, 2010).Bakare (2011) regarded money supply as a very sensitive variable, the size of which determines the pace of any economic activities. Its expansion or contraction dictates the growth in investment and output of any economy. Thus, understanding the factors driving inflation is very vital for the formulation and implementation of appropriate macroeconomic

policies. The monetaristsled by Milton Friedman believe that inflation is always and everywhere a monetary phenomenon. This monetary view is based on the quantity theory of money by Fisher (1948), which depicts that changes in money supply growth are followed by equal and proportionate changes in the inflation. However, according to Nyong (2001), inflation varies, ceteris paribus positively in relation to the growth in money supply and negatively with respect to growth in real income or output. Ogun and Adenikinju (1995) found that the period of oil boom in Nigeria characterized by rapid monetary growth was consistent with the periods when the country experienced double-digit inflation.

The growth in money supply and its economic implications is therefore an issue to be thoroughly investigated. This subject has bordered the minds of Nigerian policy makers for decades. Despite the lack of consensus among different schools of thought on its effectiveness as an instrument of monetary policy, the Central Bank of Nigeria (CBN) relies on it as its major barometer for shaping economic activities. The design and shift of the monetary measures taken by the central bank in recent times have been either expansionary or contractionary. Expansionary policy tools have been used to increase money supply with the intent of increasing output. Contractionary policy tools have been used on the other hand to decrease money supply in the economy in order to discourage consumption thereby curtailing inflation (Bakare 2011).According to Chicheke (2009), it would be logical to measure the stance of monetary policy by the growth rate of the supply of money. This is because the growth in aggregate demand depends heavily on the growth in the supply of money. This implies that, by using money growth as a measure of monetary policy, and if the supply of money is changed, it will be possible to predict its effect on money spending. Monetary policy is said to be tight when the rate of money growth is low or falling relative to a trend. On the other hand, an increase in money supply faster than growth of an economy will have the effect of too much money chasing too few goods. Hence the prices of goods will therefore increase.

For quite a long time, monetary policy in Nigeria is geared toward achieving macroeconomic objectives through expansion and contraction of the stocks of money in the economy. Macroeconomic objectives include: - price stability, exchange rate, interest

rate and moderation of inflation among other things. The contention here is that many studies on the relationship between money supply growth and inflation have been conducted both in developed and developing economy elsewhere around the globe and Africa in particular. However, few studies have empirically investigated the subject matter on Nigeria.It is therefore, imperative to carry out a comprehensive study to prove the magnitude of the relationship in Nigeria

Therefore, the aim of this study is to ascertain the extent of the relationship between money supply growth and its inflationary effects and as well as the impact of other macroeconomic variables on inflation in Nigeria.

The paper is structure as follows. Section two presents the literature review, section three covers methodological aspect of the study, while in section four, the data is presented and analyzed. Section five concludes and offers recommendations.

2. Literature Review

2.1 Conceptual Issues

Inflation is highly controversial term which has undergone modifications since it was first defined by the neo- classical economists. Farrkh (2009) defined inflation as the percentage rate of change of a price index. Two important and frequently encountered price indexes that allow measurement of inflation are GDP deflator (implicit price deflator for Gross National Product) and consumer price index (measures the price of a representative basket of goods and services purchased by the average consumer and calculated on the basis of periodic survey of consumer prices). Saleem, *et al*. (2013) Inflation is a rise in the general level of prices of goods and services in an economy over a period of time. When the general price level rises, each unit of currency buys fewer goods and services. Consequently, inflation also reflects erosion in the purchasing power of money – a loss of real value in the internal medium of exchange and unit of account in the economy

Money supply is the amount of money within a specific economy available for purchasing goods or services. A country's money supply is known as its "stock of money", The money

supply (M) of a country can be defined as "the sum of all commodity money(s), fiat money(s) and bank money that are held by non-banking public at given period of time" (Abdullahi, 2009). World Bank (2013) defined money supply growth as the average annual growth rate in money and quasi money. Money and quasi money comprise the sum of currency outside banks, demand deposits other than those of the central government, and the time, savings, and foreign currency deposits of resident sectors other than the central government.

2.2 Theoretical Framework

The classical Quantity Theory

The classical quantity theory of money has since the 16th century been used to explain the relationship between money supply and inflation. The theory expounded by Irvin Fisher in 1911 indicates that inflation occurs in direct proportionate to increase in money supply, given the level of output. Given fishers equation:

$$MV \quad = \quad PT$$
$$\uparrow M \quad = \quad \uparrow P$$

Holding velocity (V) and transaction (T) constant, any level of increase in money supply causes same level of increase in price level; and the economy being in full employment (Dwivedi, 2001). The shortcoming of the quantity theory is that it does not explain the process by which an increase in money supply causes the rise in the price level. However, Wickshell, a classical economist explained the process as follows. Additional money flowed into the economy through banks in form of loan and advances to finance new businesses. Given that the economy is in full employment, additional resources (labour) for production can only be acquired by bidding up the price level. The rise in input price leads to increase in money incomes. This leads to rise in demand for consumer goods. Under the condition of full employment, the supply of consumer goods does not increase. Therefore, higher price are bid to acquire goods. This continues until the entire increase in aggregate demand is absorbed by rise in price.

The Monetarists

The monetarists, following from the Quantity Theory of Money (QTM), have propounded that the quantity of money is the main determinant of the price level, or the value of money, such that any change in the quantity of money produces an exactly direct and proportionate change in the price level. The QTM is traceable to Irving Fisher's famous equation of exchange: MV=PQ, where M stands for the stock of money; V for velocity of circulation of money; Q is the volume of transactions which take place within the given period; while P stands for the general price level in the economy.

Transforming the equation by substituting Y (total amount of goods and services exchanged for money) for Q, the equation of exchange becomes: MV=PY. The introduction of Y provides the linkage between the monetary and the real side of the economy. In this framework, however, P,V, and Y are endogenously determined within the system. The variable M is the policy variable, which is exogenously determined by the monetary authorities. The monetarists emphasize that any change in the quantity of money affects only the price level or the monetary side of the economy, with the real sector of the economy totally insulated. This indicates that changes in the supply of money do not affect the real output of goods and services, but their values or the prices at which they are exchanged only. An essential feature of the monetarists' model is its focus on the long-run supply-side properties of the economy as opposed to short-run dynamics (Dornbush and Fischer, 1996).

The neo-classical theory

Another version of the classical theory of inflation was developed by Cambridge economists. While the classical theory of inflation considered increase in supply of money as the cause of inflation, the Cambridge version recognizes increase in the demand for money as the cause of inflation. The Cambridge version of quantity theory of money is MD = KRP (where MD = amount of money demanded; R = real output; P = general level of price; K = a constant proportion of total income people want to hold in the form of money). The Cambridge equation yields the price level equation as PMD/KR. This implies that the general level of price increase in proportion to an increase in demand for money given K and R (Okoroafor, 2012).

The institutional theory of inflation

Supporters of the institutional theory of inflation accept much of the quantity theory; money and inflation do move together. According to the quantity theory of money, changes in the money supply causes changes in the price level. The direction of causation goes from left to right;

$$MV \rightarrow PQ$$

Institutional theorists see it the other way around. Increases in prices force government to increase the money supply or cause unemployment. The direction of causation goes from right to left;

$$MV \leftarrow PQ$$

According to the institutional theory of inflation, the source of inflation is in the price-setting process of firms. When setting prices, firms and individuals find it easier to raise prices rather than lower them and do not take into account the effect of their pricing decisions on the price level. All income is ultimately paid to individual owners of the factors of production; the revenue that firms receive is divided among profits, wages, and rent. Firms are simply intermediaries between individuals as owners of the factors of production and individuals as consumers. Give the institutional structure of our economy, it's often easier for firms to increase wages, profits, and rents to keep the peace with their employees and other owner's of the factors of production than it is to try to hold those costs down. Firms then pay for that increase by raising the prices they charge consumers. In response to the rising price level, the government increases the money supply so that there is sufficient demand to buy the goods at the higher prices (Rasmussen, *et al*. 2007: 13)

From the above theories reviewed, this study adopts the quantity theory of money that explains the relationship between money supply and inflation.The reason behind this is that the theory best explains to the subject matter of this study and therefore may be used to test our hypotheses.

2.3 Review of Related Empirical Studies

CBN (1974) conducted a cross sectional analysis of the origin and development of inflationary pressures in six selected African countries. The data covered 1960-1972. The explanatory variables included changes in money supply, deficit financing and real gross domestic product. Using Ordinary Least Square (OLS), the result obtained indicates that current changes in money supply and domestic credit have no significant impact on the level of prices. The third variable had positive sign and the coefficient of determination was 0.06. Canetti and Greene (1992) Studied a group of 10 African countries, both cross-section and times series regressions indicated that models of inflation based solely on monetary expansion and real income growth (which is related negatively to the inflation rate) leave sizable portions of the inflationary process unexplained.

West Africa Monetary Agency (WAMA) (2009) analyzed the relationship between money supply growth and inflation in each of the member countries. The results indicate that the relationship between money supply growth and inflation depends on the peculiar circumstances of the countries concerned. Inflation exhibited a positive relationship with money supply in Benin, Guinea-Bissua, Mali, Gambia, Ghana, Guinea, Cape Verde and Liberia. Thus, in these countries, monetary policy contributed to movements in the general price level. On the other hand, the relationship was negative in Senegal, Togo, Nigeria, Burkina-Faso, Cote d'voire, Niger and Sierra-Leone. The negative correlation observed in certain countries confirms the existence of other determinants of inflation which may be structural in nature or attributed to supply-side factors.

A study conducted on sources of inflation in Sub-Saharan African countries by Barnichon and Peiris (2008) found that an increase in the growth rate of money supply as the main source of inflation. In the same vein, Thornton (2008) findings proved that money supply has a significant impact on inflation in high-inflation countries than in low-inflation countries. Assenmacher-Wesche and Gerlach (2006) who investigate the relationship between money growth and inflation over different band of frequencies for Japan, Euro area and Swiss Bank, they use band spectral analysis technique and demonstrated that the relationship between money growth and inflation holds only for low frequencies, for high frequencies output gap causes inflation.

De Grauwe and Polan (2005) used a sample of 160 countries spanning whole world over a thirty years period to study the relationship between money supply and inflation. They reported a strong positive link between the two variables. Their study demonstrates a weak link between inflation and money growth for low inflation countries. Greene and Cavetti (1991) study stated that monetary expansion and exchange rates largely propagated inflation in ten African countries. It is observed then that there is no perfect agreement on the totality of factors that cause inflation in developing countries including Nigeria.

Mukhtar and Zakari (2010) investigated the relationship between money supply, deficit financing and inflation in Pakistan. The empirical findings suggest that in the long run inflation is not related to budget deficit but only to supply of money and supply of money has no causal connection with budget deficit.

Adenuga *et.al.* (2009), in examining whether inflation is purely monetary phenomenon in Nigeria from 1970-2009, employed ordinary least square approach. Outcome of the analyses confirm that inflation is not a purely monetary phenomenon in Nigeria because the coefficient of broad money supply is less than unity. Furthermore, Omoke*et al*. (2010) tested the causal long-term relationship between budget deficit, money growth and inflation in Nigeria. Augmented Dickey-Fuller (ADF) and Philip-Perron (PP) test were carried out to test the stationarity of the variables used. The result of the study pointed to a close long-term relationship between inflation and money supply.

3 Methodology

For the purpose of this study, secondary data has been used in form of annual time series owing to the nature of the research problem under investigation. Therefore, different data sets were collected from the various sources such as the Central Bank of Nigeria (CBN) Statistical Bulletins, National Bureau of Statistics and publication of other related national and international institutions such as World Bank, UNCTAD and UNDP.

Inflation rate is measured as the percentage increase in the retail price index (RPI) or a consumer price index (CPI) over a period of one year. It represents an increase in the price

of a basket of goods and services expressed yearly basis (Ajayi *et al*, 1980). Money Supply Growth Rate (*M*1&*M*2): is measured as the percentage rate of change in the money supply from the previous period (Bakare, 2011). Interest rate is often expressed as an annual percentage of the principal. It is calculated by dividing the amount of interest by the amount of principal (Taylor, 2007). Exchange rate is measured as the price of a foreign currency in terms of the units of a local currency, (Obadan, 2006).Fiscal deficit is measured as the difference between the government's total receipts (excluding borrowing) and total expenditure in percentage (Bayo, nd).

3.1 Method of Data Analysis

This research work employed the use of quantitative technique of data analysis. The quantitative tools used are the multiple regression analysis, using the ordinary least square (OLS) method. The use of OLS technique is due to its properties of being Best Linear Unbiased Estimate (BLUE). It does give picture of the estimates with minimum biasness. The study also employ the use of autoregressive distributed lag model (ARDL) bound F-test for co integration therefore, both STATA and MICROFIT econometrics software were used in the analyses. To guard against spurious result, the study took caution by checking the properties of the variables via the Augmented Dickey-Fuller (ADF).

3.2 *Model Specification*

The theory guiding this study is the famous quantity theory of money propounded by fisher (1911). The theory in its simplest form depicts that changes in the stock of money supply will be translated into equi-proportionate change in the general price level (inflation rate). The model for this study is based on the theoretical framework above as adopted in the study carried out by Adenuga *et al.* (nd) and Bakare (2011) which is modified to form the followings:-

INFL = f(MS1, MS2, IR, EXR, FID)……………………………………… (1)

Converting above equation into elasticity and specifying it in a regression form yield:-

$INF_t = α + β1MS1_t + β2MS2_t + β3ITR_t + β4EXR_t + β5FID_t + μ_t$...............(2)

Where

INF = Inflation rate

MS1 = Narrow money supply growth

MS2 = Broad money supply growth

ITR = Interest rate

EXR = Exchange Rate

FID   =Fiscal Deficit

u_t = Error term

4. Data Analysis and Discussion

Table 4.1: OLS Estimation

Variable	Coefficient	Std.error	t-statistics	Prob
C	13.94889	11.28474	1.24	0.227
MS1	.5535445	.4218887	1.31	0.201
MS2	-.6064881	.4988974	-1.23	0.230
ITR	1.202225	.5662325	2.12	0.043
EXR	-.1431015	-.0551811	2.59	0.015
FID	.8963709	.8738399	1.03	0.314
R^2	0.3477			
DW	1.191953			
F	2.88			0.0329

Source: Author's computation using STATA

Interpretation of OLS Regression

Annual time series data covering the period of year 1980 to 2012 is used and the results are presented in ordinary least square of simple regression analysis for each explanatory variable selected for this study. The result of the OLS estimation in Table 4.1 reveals that, if all the explanatory variables for inflation function are fixed at zero the percentage increase in inflation rate in Nigeria would be about 139.5% very often the mechanical value of this intercept is that, it has no physical or economic meaning (perhaps it reflects the influence of all the omitted variables). It indicates that, if all other omitted variables are selected as a measure to combat inflation they will bring positive impact on inflation which

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will affect the macroeconomic variables such as unemployment, investment, and consumption via multiplier effect.

The partial regression coefficient of narrow and broad money supply growth (MSI and MS2) of 55.4% and 60.3% respectively indicates that when other variables employed in this model are held constant a unit change in narrow and broad money supply will bring about 55.4% and 60.3% changes in the inflation rate of Nigerian economy over the study period. Inflation is an increasing and decreasing function of narrow and broad money supply respectively. The rate of change as revealed by this result is average given the economic potential of broad money supply as a strong instrument of monetary policy tool that should have large impact in combating inflation but is not the case in Nigeria. This is an indication that, selecting broad money supply as a monetary policy instrument to cajole market players in order to maintain price stability may not help to achieve the nation macroeconomic objectives, which will therefore render the monetary policy ineffective in controlling inflation in Nigeria.

By the same measure if interest rate changes by a unit, where other variables are fixed, inflation rate will change by 102.2%. The relationship between inflation and interest rate is positive and significant in this study. This result reveals that, if interest rate increases or decreases the inflation rate in the economy will respond in the same way and the percent change in inflation using interest rate as monetary policy instrument to control inflation in Nigeria is far better compared to broad money supply but it is not strong enough to combat inflationary pressure ravaging our economy.

The partial regression coefficient of exchange rate stood at 0.14%. It shows a very weak impact on inflation, meaning a unit increase in exchange rate will lead to 0.14% impact on inflation. This impact is moderate and not good enough to be used as monetary policy instrument in combating inflation in Nigeria. It shows that Nigerian inflationary problem is not an imported inflation but rather it is an internal governmental policy problem. It is either the monetary policies adopted over the years were not properly formulated and or not properly implemented to achieve the desired objectives.

Furthermore, the coefficient of fiscal deficit is 0.89 percent. It indicates the existence of positive relationship between fiscal deficit and inflation in Nigeria. A unit change in fiscal deficit would cause a variation in inflation equivalent to 0.89%.Therefore this result indicates a greater influence of fiscal deficit on inflation within the study period.

4.2 Unit root test for stationarity

This study examines the relationship between money supply growth and inflation in Nigeria. Using time series data set for the period 1980–2012, we begin with the conventional unit root test for stationarity of the series variable using the Augmented Dickey-Fuller (ADF) unit root test, the result is presented in the table 4.2 below:

Table 4.2: Results of Augmented Dickey-Fuller (ADF) Unit Root Test

Variable	ADF statistics	Critical values	Order of integration
Inflation	-5.369 (0.0000)***	1% = - 4.325 5% = - 3.576 10% = - 3.226	Stationary at first difference value
MS1	-4.336 (0.0028)***	1% = - 4.316 2% = - 3.572 10% = - 3.223	Stationary at level value
MS2	-4.171 (0.0050)***	1% = - 4.316 5% = - 3.572 10% = - 3.223	Stationary at level value
ITR	-8.997 (0.0000)***	1% = - 4.325 5% = - 3.576 10% = - 3.226	Stationary at first difference
EXR	-5.303 (0.0001)***	1% = - 4.325 5% = - 3.576 10% = - 3.226	Stationary at first difference value
FID	-4.257 (0.0037)***	1% = - 4.316 5% = - 3.572 10% = - 3.223	Stationary at level value

Source: Author's computation using STATA software

Note: ***, **, indicate significance at1% and 5%

Interpretation of Augmented Dickey-Fuller (ADF) Unit Root Test Results

The result of the Augmented Dickey –Fuller (ADF) test revealed that there were mixtures in the level of stationarity across the variables in question for the period under study. Inflation as the dependent variable became stationary at first difference value 1(1) at 1% level of significance i.e. Mackinnon approximate value of 0.0000 which indicate that the null hypotheses (H_O) for the existence of non-stationary should be rejected and accept the alternative hypotheses (H_1) that is stationary. Other explanatory variable such as narrow money supply growth (MS1), broad money supply growth (MS2) were stationary at level values that is integrated of order 1(0) and Mackinnon values of 0.0028 and 0.0050 indicates 1% level of significance. However interest rate and exchange attained stationarity at first difference value 1(1) going by their test statistics i.e., Mackinnon approximate value 0.0000 and 0.0001 indicating 1% level of significance respectively. Fiscal deficit shows stationarity at level value 1(0) with Makinnon 0.0037 equal to 1% level of significance.

4.3 Bound F-test for co integration

The empirical analysis of this study involves the determination of order of integration of the variables in question. This would enable the study to use either ARDL model or not. After achieving stationarity, the next step is to conduct the bound F-test in order to establish a long-rung relationship among the variables.

Table 4.3: Results of bound F-test for co integration

Dependent variable	Function	F-statistics
INF	F_{INF}(INF/MS1/MS2/ITR/EXR/FID)	4.3814**
MS1	F^{MS1}(MS1/INF/MS2/ITR/EXR/FID)	--------
MS2	F_{MS2}(MS2/MS1/INF/ITR/EXR/FID)	--------
ITR	F_{ITR}(ITR/MS2/MS1/INF/EXR/FID)	1.5769
EXR	F_{EXR}(EXR/ITR/MS2/MS1/INF/FID)	.93406
FID	F_{FID}(FID/EXR/ITR/MS2/MS1/INF)	2.2130

Asymptotic critical value	5%		10%
Lower bound	2.5046		2.0353
Upper bound	3.8786		3.2694

Source: Author's computation using MICROFIT software

Interpretation of the results of bound F-test for co integration

The result of the bound test for co integration in Table 4.3 above indicates that co-integration is present when INF is treated as dependant variable. This is because the computed F-inf(INF/MS1/MS2/ITR/EXR/FID) is 4.3814 which is higher than the upper bound critical value at both 5% and 10% that is 2.5046 and 3.8786 respectively. It implies that there is only one single long run relationship between inflation and other explanatory variables such as narrow money supply growth (MS1), broad money supply growth (MS2), interest rate, exchange rate and fiscal deficit in Nigeria for the period under study.

Estimated long run coefficient using ARDL approach

Since the co integration between the variables has been established, ADRL was employed in the determination of long run relationship between inflation and money supply growth in Nigeria (1980 – 2012).

Table 4.4: Estimated long run coefficient base on ARDL model

Regressor	Coefficient	Standard error	T-ratio	P-value
Dependant variable: INF				
MS1	.48302	.54165	.89176	.381
MS2	.074288	.63606	.11679	.908
ITR	.31409	.75061	.41844	.679
EXR	-.088564	.074654	-1.1863	.247
FID	-1.3235	1.4260	-.92810	.363

Source: Author's computation using MICROFIT software

Interpretation of the estimated long run coefficient base on ARDL approach

The result of long run coefficient is presented in Table 5 above. Long run elasticities of inflation are positive with the exception of exchange rate and fiscal deficit. The coefficients of money supply growth (MS1 and MS2) are positive and statistically not significant is represented by .48302 and .074288. Interest Rate (ITR) has a coefficient of .31409 is also positive but statistically not significant. Exchange Rate and Fiscal Deficit contradict the a-priory expectation with negative long run elasticities of (-0.088564 and -1.3235) respectively. The implication of this result is that a 1% decrease in exchange rate and fiscal deficit will lead to 0.10% and 1.32 % decrease in inflation.

Error correction representation for the selected ADRL model

The short run relationship of the macroeconomic variables was determined in Table 6 below using ADRL approach.

Table 4.5: Short run error correction results

Regresor	Coefficient	Standard Error	T-Ratio	P-value
Dependent variable INF				
MS1	.29730	.32287	.92079	.366
MS2	-.41455	.36994	-1.1206	.273
ITR	.19332	.48881	.39549	.696
EXR	-.054510	.051164	-1.0654	.296
FID	1.0217	.74227	1.3765	.180
ECM(-1)	-.61550	.14637	-4.2051	.000

Source: Author's computation using MICROFIT software

Interpretation of estimated error correction based on ARDL model

The short run analyses in Table 4.7 above indicates the present of short run relationship because the ECM is correctly signed (negative) and statistically positive as indicated by 1 percent critical p-value. The coefficient of broad money supply growth (MS2) and exchange

rate have negative signs as (-0.41455 and -0.054510) respectively. While the coefficients of narrow money supply growth (.29730), interest rate (.19332) and fiscal deficit (1.0217) show positive but not statistically significant. The coefficient of ECM suggests the speed of adjustment of the model. It implies that in the current period 61% of the disequilibrium can be removed from the system.

Properties of ARDL Estimate: R-Squared, F-statistics, DW-statistics and P-value

Table 4.6: Properties of ARDL Estimate

R-Squared	0.578
F-statistics	6.581
DW-statistics	2.232
P-value	0.000

Source: Author's computation using MICROFIT software

Interpretations of the Properties of ARDL Estimate

The Table 4.6 above shows the values of regression statistics for money supply growth (MS1 and M2), interest rate, exchange rate and fiscal deficit. The value of R-squared is 0.578 which indicates that 57.8 percent variation in inflation is due to money supply growth, interest rate, exchange rate and fiscal deficit. F-statistics result suggests that the model is significant at 1% level of significance because its p–value is 0.000. F-statistics is the ratio of the regression mean square and error mean square. It is used to determine the significance of the overall regression model in regression analyses. The value of F-statistics in above model is 6.581 which show the significance indicating adequacy of the model. Durbin Watson statistics 2.232 implies the absence of serial correlation between variables.

4.4 Granger causality test

Table 4.7: Granger causality test

Null Hypothesis	Observations	T	p-value
MS1 does not granger cause INF	32	2.26	0.032
INF does not granger causeMS1	32	0.11	0.910
MS2 does not granger cause INF	32	2.52	0.018
INF does not granger causeMS2	32	-0.21	0.837
ITR does not granger causeINF	32	0.36	0.718
INF does not granger cause ITR	32	0.18	0.856
EXR does not granger cause INF	32	-1.11	0.278
INF does not granger cause EXR	32	-0.96	0.343
FID does not granger cause INF	32	-2.79	0.009
INF does not granger cause FID	32	-0.96	0.343

Source: Author's computation using STATA software

Interpretation of granger causality test results

The causality test results presented in Table 4.9 above indicates an evidence of unidirectional causality running from narrow money supply growth (MS1) to inflation. Similar evidence of unidirectional causality was found running from broad money supply growth (MS2) to inflation. Moreover, unidirectional causality was established running from fiscal deficit to inflation. However, causality result reveals no causality among the other variables as shown by the probability value of their test.

4.5 Discussion of Results

This study is aimed at empirically investigating the relationship between money supply growth and inflation in Nigeria for the period from 1980 to 2012. Findings of our OLS estimation reveal that narrow money supply positively influenced inflation which is line with the work of Friedman and Kuttner (2007), Busari(2007), Ajakaiye (2005) and Ghazali*et al*.(2008).The result of the slope coefficient of broad money supply indicates that inflation is decreasing function of broad money supply (i.e. a unit change in MS2 will lead

to about 60% change in inflation in Nigeria within the period under study).This result is in line with the study conducted by Emmanuel (2000) and contradicts the work of Emmanuel (2012), Ajakaiye (2005) who studied the determinants of inflation in Nigeria.

Furthermore, the estimated coefficients of both fiscal deficit and interest rate have a positive sign indicating positive influence on inflation. Therefore, such results are in line with studies carryout by Omoke,*et al.*(2009),Bakere (2011), CBN (1974);Hossain and Islam (2013),Oyejide (1972). Moreover, our findings show that exchange rate in Nigeria was inversely related to inflation within the study period which is in conformity with Akinbobolo(2012), Emmanuel (2010) who found similar negative relationship in their woks,but contradicts the work of Muhammadu and Phillip (2003).

The results of findings using Autoregressive Distributed Lag (ARDL) bound F-test for co-integration reveals that there is an existence of co-integration among the variables when inflation is treated as dependent variable. This is indicated by the value of computed F-statistics 4.3814 which is higher than the upper bound critical value at both 5%and10% respectively. This implies long run relationship between inflation money supply growth, interest rate, exchange rate and fiscal deficit. This result is in line with findings of Kesavarajah and Amirthalingam(2010) Strano (nd) and contrary to the work of Omeke and Ugwuanyi (2010).

Money supply growth in Nigeria based on ARDL bound F-test approach can be viewed as a long run forcing variable in explaining inflation. This finding is in tandem with the work of Ghazali*et al* (2008), Muktar and Zakaria (2010), Busari (2007),Okoroafor (2002) Mohamadu and Phillip (2003) Emmanuel (2010) who all found long run relationship between money supply and inflation. On the other hand, findings of this study contradict the work of WAMA (2000) Dlamini and Nxumalo's (2001). Moreover, our findings based on ARDL reveals the existence of long run positive relationship between inflation, interest rate and fiscal deficit in Nigeria for the period under study. These results are concomitant with the study conducted by Hossein and Islam (2013) on the determinants of inflation. However, the findings especially on fiscal deficit is inconsistent with the work of Muktar

and Zakaria(2010).Exchange rate in Nigeria found to be negatively related to inflation in the long run. This shows that the result of findings based on ARDL reveals that a unit change in exchange rate would have a decreasing effect on inflation within the period under investigation. This finding is in tune with the findings of Emmanuel (2010) and inconsistence with Ajakaiye (2005)

Granger causality test is employed for investigating the bilateral or unidirectional causal links between and among the variables. Overall calculation reveals that there is no evidence of bilateral causal link between the tested macroeconomic variables for Nigeria. On the other hand, empirical result shows that unidirectional causality was found running from both money supply growths and fiscal deficit to inflation. This result also consistent with the study carryout by Ndenzako (1988) Ajakaiye (2005) and Omoke and Ogwunyi (2001). The result of the direction of causation however, contradicts the work of Chaudhary, (1995) who found a bilateral causation in his work.

5. Conclusions and Recommendations

Based on the findings of this study the following conclusions are drawn.

1. Money supply growth increases inflation in the long run. Therefore, in order to curtail inflation in Nigeria there is need to reduce money supply growth.
2. There is a unidirectional causality running from money supply growth to inflation in Nigeria within the study period. This means that inflation is accompanied by expansion of money supply.
3. Other factors such as exchange rate and fiscal deficits negatively influence inflation. On the other hand, increase in interest rate increases inflation in Nigeria within the study period.

Having identified a positive long run relationship between money supply growth and inflation rate, this study recommends that efforts should be geared towards improving stabilization programs particularly open market operations to control excess money in circulation which will curtail inflation.

Governments should stream line its policy on interest rate. Interest rate plays a pivotal role in explaining inflationary process. Many productive investments are not explored in Nigeria due to high rate of interest. Investors may find it difficult to accept higher rate, but moderate rate of interest may attract more borrowers and more investment opportunities which would subsequently lead to higher productivity and moderate inflation rate in the economy.

Though exchange rate may not be the most important factor in inflation determination in Nigeria, the fact that it influence inflation negatively, suggests that exchange rate stability is a necessary condition for stable domestic prices. Increase output production and diversifying the economy from import based economic activity to export based activity will increase output supply. Increasing the food supply and ensuring fiscal and monetary discipline seems to be a panacea for a sustainable macroeconomic stability in Nigeria.

Deficit financing encourages more money in circulation which does not tally with productivity thereby inducing inflation. Therefore, government borrowings should be reduced. The government should display a high sense of transparency in the fiscal operations to bring about realistic fiscal deficits. Fiscal deficits, where recorded should be channeled to productive investments like road construction, electricity provision, and other overheads that will serve as incentives to increased productivity and high Gross Domestic Product (GDP).

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