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DETERMINANTS OF INFLATIONARY PRESSURES IN NIGERIA: A STRUCTURAL CO-INTEGRATION APPROACH (1980-2012)

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Abstract
In recent times, the Nigerian economy has witnessed a persistent upward trend and volatility in her domestic price level and this has become a major socio-economic problem in Nigeria. This study therefore examines the determinants of inflation in Nigeria, for a period of 33 years (1980 2012), applying econometric analysis based on Co-integration test, unit root test and Error Correction Mechanism (ECM) modeling. The findings established that interest rate, money supply, foreign exchange rate and government fiscal deficit are, in the long-run, positively and significantly related to inflation, confirming that they are major contributors to inflationary pressures in Nigeria, while Income output (GDP) with significant inverse relation implies inflation discourages growth. There is also evidence of a lag effect of monetary policy aggregates on the price level. The speed of the equilibrium adjustment of the model (negative ECM coefficient) is slow and suggests that inflationary pressures in Nigeria tend to adjust slowly to the disequilibrium in these explanatory variables in the long run. Based on these findings, the study recommends: the sustenance of increase in production capacity through economic efficiency to dampen the inflationary pressures. The optimal interest (lending) rate should reflect the overall internal rate of return in the productive sector with due attention to market fundamentals. There is need for fiscal policy initiatives that will channel funds to productive sector and thus, excess liquidity could be minimized in the system. Monetary authority should ensure effective coordination of monetary and fiscal policies to avoid counter-cyclical effect. They should also take cognizance of policy lag effect and therefore design monetary policy in line with the expected magnitude of expected changes.

Keywords: *Inflation, Determinants, Co-integration and Unit Root Test*

Background to the Study

In most developing economies, the maintenance of price stability has continued to be an overriding objective of monetary policy, based on the implicit belief that no sustainable growth can be achieved in the midst of persistent rise and volatility in price level. Since the beginning of 1980s, the Nigerian economy has witnessed a persistent upward trend and volatility in her domestic price level, whiles her performance in terms of economic growth,

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has been very sluggish. This has become a pervasive and socio-economic problem in Nigeria.

Inflation rates in Nigeria were relatively stable between 1960s and 1970s. But between 1987 and 2012, the incidence of high rates of inflation became more frequent. (CBN, 2012). This was attributed among other factors, to the introduction of Structural Adjustment Programme (SAP) in 1986 and subsequent rising prices and high interest rates in the industrialized economy of the trading partners which were imported into Nigeria through the country's high marginal propensity to import. (Masha, 2000 and Asogu, 1991). From 1986 to 1995, inflation rate rose from 5.4 per cent to 72.8 per cent. As at 2012, the inflation rate stood at 12.7 per cent which is still more than the single digit policy target (CBN, 2012). The above highlights suggest that there is a fundamental problem and so, an insight into the determinants of inflationary pressure in Nigeria, has become pertinent.

Potentially, unfavorable implications of inflationary pressure are reflected on major macroeconomic activities. One of the major arguments is that inflation impedes efficient resource allocation by obscuring the signaling role of price changes which has been adjudged as an important guide to efficient economic decision-making. There is also less than full agreement on the sources of this negative impact of inflationary pressures transmission path. (Trueman, 2003).

In addition, despite her considerable openness to trade, Nigeria is still being confronted with balance of payment deficits and her economic environment have not been able to attract with full potentials, foreign direct investment, given the unstable and high rate of inflationary tendencies (Busari, 2007). This affects growth adversely.

Furthermore, Nigerian capital market, as a source of funds, reflects pricing inefficiencies with prohibitive interest rates in the credit market due to inflation. This creates difficulty in raising long term funds for capital investments This increasing rate of opportunity cost of retained earnings as well as the level of real interest rates have been currently inducing disintermediation with its ultimate adverse effect on economic growth. This, also apparently results to a dearth of long-term project investments in Nigeria (Mordi et al 2007).

Wheelock (1995) also contends that bank financial distress occurs largely as a result of falling income. According to this view, inflation reduces demand for money (loan) and bank failures are the means by which money supply falls so as to accommodate the decline. One argument emanating from this view is that bank financial distress tends to be more severe in periods of high inflationary pressure.

Virtually most of the related studies reviewed, have some methodological and conceptual problems that undermine their accuracy and thus their efficacy for effective policy purposes. Estimation of non-stationary time series on another, which are subject to accidental or induced auto-serial correlation, can give rise to spurious regression and so leads to misleading results (Gujarati and Porter, 2009 and Engle and Granger, 1987). For instance, in Odusola et al (2001) and Folorunso et al (2000), no application of unit root tests was made to reduce misleading results. In addition, the use of cross-country analysis as applied by Cozier et al (1992) precludes country specifics. Inference based on results of such analyses leads to potential biases. Blonigen and Wang (2003) also argue that pooling rich and poor countries together without distinguishing between their level of development leads to incorrect inferences.

Recognizing the above gaps and challenges of the previous studies, there is need to reexamine this problem holistically by, using Nigerian time series and applying the modern econometric techniques (co-integration, error correction mechanism, unit root test) to see if more authentic result could be achieved for effective policy planning and

implementations. This paper is structured into five sections. Section one introduces the study. Section two covers the related reviewed literature under the conceptual, theoretical and empirical framework.. In section three, the empirical methodology of the study is introduced. Section four presents the data and analysis of the major empirical findings, while section five summarizes the study and concludes the study with some policy recommendations.

Objectives of the Study

The main objective of this study is to examine empirically the major determinants of inflation in Nigeria through identification of the nature of their relationships.

Hypothesis

In order to achieve this objective the following hypothesis is formulated:
There is no significant long-run relationship between inflation and the generally regarded and major inflation determinants which include money supply, exchange rate, interest rate, government fiscal deficit, and income output (GDP) in Nigeria.

Review of Related Literature

Conceptual/Theoretical Issues

The concept of inflation has been defined in various ways by different scholars of economics. Although the definitions are varied, it is pertinent to note that no definition is quite explicit in explaining the concepts of this economic variable. However from the various definitions we may attempt to assert what determines the cause of inflation.

Inflation is described as a situation of rapid, persistent and unacceptably high rise on the general price level, in an economy, resulting to general loss of purchasing power of the domestic value of currency (Batani, 2004). Included in this definitions are the prices of those currently produced goods and services and do not include those of assets. The point of emphasis is on the rise in price level of a particular commodity or general price level in the economy or relative price levels. Lavy and Sarvet, (1987) as well as Coates, et al (1978), defined inflation as" substantial and sustained increase in the general price level." Comparatively, their definitions have the merit of having eliminated transitory price fluctuation. The definitions indicate that a once and for all rise in price level may not depict an inflationary phenomenon but if the situation is sustained, inflation is implied with serious consequences for macroeconomic stability. The definition, however fails to explain what constitutes a substantial price increase and it is therefore ambiguous. However, this depends on the institutional structure of the economy, the extent to which inflation has been anticipated, and how it is controlled within the economy.

In the economic literature, the concept of inflation has been, intrinsically linked to money, as captured by the often heard maxim "inflation is always and everywhere a monetary phenomenon" as by Hamilton (2001) citing the quantity theorists represented by Milton Friedman,(1968). Thus in the long-run, as money supply increases the price level also rises. By implication since monetary aggregates are normally the assets/ liabilities of central banks, it is believed that central banks can reasonably control the quantity of money supplied at a level consistent with the absorptive capacity of the economy. At that level, macro economic conditions are expected to be stable. When the price stability objective is achieved, it ushers in higher levels of economic well-being among the citizenry Friedman (1968).

Generally, three major aspects for explanation of causes of inflation include fiscal, monetary and Balance of Payment (BOP) aspects. While in the monetary aspect, inflation is considered to be due to an increase in money supply, in the fiscal aspect, the budget deficits are assumed to be the fundamental cause of inflation especially in countries with prolonged high inflationary pressure. In the Balance of payment aspect, emphasis is given on the exchange rate depreciation which brings about inflation, either through high

import prices and increase in inflation expectation which are accommodated, or through an accelerated wage indexation mechanism (Egwaikhhide et al, 1995 and Odusola et al 2001).

Related Empirical Issues

Studies have also shown that developing countries are often seen to be worst off when the macroeconomic environment is unstable or volatile. Hnastkovska and Loayza, (2004) investigated the relationship between macroeconomic volatility (inflation) and long-run economic growth (GDP). Using cross-country data for the period 1996-2000, they found that macro-economic volatility and long-run economic growth (GDP) were negatively related, and that the negative link was exacerbated in countries that are poor, institutionally underdeveloped, undergoing intermediate stages of financial development, or unable to conduct counter cyclical fiscal policies.

In another development, Hong, (1977) found that inflation affects stock prices through the additional tax burden on the firms. Consequently, there was wealth transfer from firms to the government treasury bills. There is therefore, less incentive for companies to undertake capital long-term investment under a situation of high inflationary growth.

In Nigeria evidence of strong relationship between inflation and interest rate and also money supply have been established by Busari (2007), and Asogu (1991). Williams and Adedeji (2004) examined price dynamics in the Dominican Republic by exploring the joint effects of distortions in the money and traded-goods markets on inflation, holding other potentials influences constant. They found that the major determinants of inflation were changes in monetary aggregates, real output, foreign inflation and the exchange rate. The authors observed that inflation was influenced by imbalances in the money markets.

Odusola and Akinlo, (2001) showed that inflation in Nigeria, was largely determined by the absence of fiscal prudence on the part of government, parallel exchange rate shocks and output. Mordi et al (2007) in their study on inflation dynamics in Nigeria concluded that exchange rate, money supply, interest rate, real output or aggregate income, foreign prices and past values of inflation were inflation determinants in Nigeria, likewise Busari (2007).

Furthermore, according to Mankiw, Romer and Weil (1995), if inflation were to cause uncertainty and make savers and investors less willing to undertake long-term projects, it might lower the rate of investment in tangible and human capital. A reduction in investment would lower the steady state of capital/labour ratios, and hence reduce the level of output in the long-run equilibrium.

Theoretical Issues on Estimation Technique and Procedure

The study applied modern econometric analytical techniques based on Co-integration, unit root test and Error correction mechanism (ECM), using Ordinary Least Square regression (OLS) for the data analysis. In line with recent development in time series modeling, unit root test is applied to check the stationary property of time series and this could form the strategy to reduce (if not eliminate) the risk of spurious regression.(Engel and Granger, 1987). Basic concepts in time series econometrics states that empirical work on OLS multiple regression analysis for time series data, implicitly assumes that underlying time series is stationary. But sometimes auto or serial correlation may result, due to the fact that underlying time series is non-stationary. This may give rise to spurious regression and it misleads the analyst (Granger and Newbold, 1974 and (Gujarati and Porters, 2009).

Consequently, prior to applying the co-integration test, the first step was to run the OLS estimation at level and then the unit root test to establish if the time series have a stationary trend, and, if non-stationary, to show the order of integration through

'differencing'. A time series is stationary if the mean, variance and auto-variance are not time- dependent. The Augmented Dickey Fuller (ADF) (1981) unit root test was applied. The assumption is that the time series used for this research have unit root stochastic process or are non-stationary which can be represented as follows:

$$?Yt = \text{ío} + \text{í}1t + ?Yt\text{-}1 + \ldots S?i\ ?Yt\text{-}i + ?t \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (1)$$

where Y is the single time series for (INF, MS, INT, FXR and GDP) under investigation and í the parameter coefficient, ?t is a pure white noise error term, ?i and m are coefficients of the lag terms and m is the length of the lag terms which is automatically selected using Akaike information criteria. If '?' is 0, then there is unit root, but if it is less than zero (negative), the null hypothesis is rejected and the alternative that the series is stationary is accepted (Kwiatkowski et al 1992).

Capitalizing on the likelihood of the co-movement in their behavior which implies that there is possibility that they trend together towards stable long run equilibrium, Johansen (1995) Co-integration test was applied. Co-integration occurs when two or more time series variables which themselves may be non-stationary, drift together at roughly the same time. This implies that a linear combination of the variable is stationary. Based on this, we specify the full information maximum likelihood based on the Vector autoregressive equation (VAR) as mathematically stated below:

$$y_t = a_1 y_{t1} + \ldots\ldots\ldots + a_{sk} y_{t-k} + ?x_t + \mu_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (2)$$

where yt is a k-vector of differenced stationary time series, 'k' being the lag length for the first order differenced variables, /(1), 'xt' is a vector of deterministic variables, 'a' is a constant, ? are the coefficients of the deterministic variables and μ_t is a vector of innovations or error term and it is known as the adjustment parameters in the vector error correction model, while “t” indicates time. Applying the maximal non-zero Eigen values and the trace test of the maximum likelihood ratio, with reference to the level of significance, the number of Co-integration relations could be determined which could indicate the existence of long run relationship.

However, Co-integration process ignores the short run dynamics that might cause a relation not to hold in the short run and this formed the basis for application of Error correction mechanism (ECM). ECM is an extension of the partial adjustment model in co-integration technique which is the traditional approach to modeling of short run dynamics with long run equilibrium. It thus, preserves the long run relationship while specifying the system in a short run dynamic way, Dickinson et al (1992). Granger and Newbold (1977), and Granger and Engel (1987) are among the studies that have proved that a co-integration is a sufficient condition to run an ECM process. The co-integration residual term is known as the Error Correction term here, since the deviation from the long equilibrium is corrected gradually through series of partial short-adjustment (Gujarat and Porters 2009). A search for parsimony in this dynamic model typically follows the generalto-specific modeling of Hendry (1995) (using various information criteria (Akaike, Schwarz, log likelihood, etc) which minimizes the possibility of estimating relationship while retaining long-run information, if the variables do not have the same order of integration, (Engel and Granger (1987). Based on this, the model specification is presented in a dynamic process with equation stated below:

$$Y_t = a_0 + \sum_{i=1}^{ai} Y_{t-1} + \sum_{i=0} a_i Z_{t-1} + ai\ ecmt\text{-}1 + \ldots\ldots \quad (3)$$

Where a_0 is a constant, Y_t is a vector of endogenous variable and dependent variable,, Zi is a vector of explanatory variables and a_i is the parameter coefficients, Y_{t-1} is the lag term of the dependent variable. The ecmt-1 or error correction term is the residuals from the long-run co-integration process and its coefficient measures the speed of the adjustment of the disequilibrium while $_t$ is the white noise. As long as the co-integrating vector term (ECM) ecm_{t-1} is stationary and well defined, (negative), the ECM estimation will then confirm the earlier proposition that the variables are co-integrated and so, have long term relations. The insignificant or redundant variables are usually omitted at the parsimonious stage using Akaike Information Criteria and Schwartz Criteria. Finally, diagnostic tests are performed on the results with a view to validating the models.

Methodology

The data is extracted from Central Bank of Nigeria (CBN) publications which include CBN Annual Reports and Statement of Accounts 2012,and CBN Statistical Bulletin, 2012, CBN Economic and Financial Reviews,. The period of study spans through 1980 to 2012. This study applied Monetarist Open economy basic model specifications, using straight-line equations to establish inflation determinants.

Open Economy Model: (Price Model)

It is now quite common to start the analysis of the determinants of inflation in developing economies from the popular IS LM model framework for a small open economy (Kim, 2001 and Lissovelik, 2003). An open economy model is a structural econometric model which is an extension of the monetarist framework for price determination. The general price level is postulated to be a weighted average of some baskets of goods and services categorized, as tradable and non-tradable as shown below:

$$P_t = qP_t^N + (I - q)P_t^T \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

Where $0 < q < 1$

Where the superscript (T) indicates tradable and (N) non -tradable goods and q is the weight of non-tradable prices of the price index P_t. The general assumption is that the price of tradable goods in a small open economy is determined by the world market price P^f with the price in the domestic economy being a function of the foreign currency price Pf and the domestic exchange rate 'E' (with an increase representing a depreciation) and could be stated as follows

$$P_t^T = aE + \beta P_t^f \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (5)$$

For nontradable goods, the demand is assumed to be related to the nature of the overall demand in the domestic economy, hence, the price of non-tradable goods is a function of domestic money market conditions such that real money supply $(m_t^s \; P_t)$ equals real money demand $(m_t^d \; P_t)$, giving.

$$P_t^N = \; | \; [(m_t^s \; P_t) - (m_t^d \; P_t)] = \; | \; (m_t^s \; m_t^d) \quad \ldots\ldots\ldots\ldots\ldots (6)$$

And is considered a scale factor which expresses the relationship between aggregate demand and demand for nontradable goods, hence increase in money supply will increases the price of non-tradable goods. It is further assumed that the demand for nominal money balances (M_t) is an increasing function of, a scale variable ( ) (income, wealth or expenditure, in real terms) and an index of expected real rate of return, (own rate of return on money and opportunity cost of holding money), adjusted for expected inflation rate. An increase in the opportunity cost of holding money, by reducing the demand for real money balances, will result in an increase in prices or by increasing aggregate demand, would generate inflationary pressures shown as follows:

$M_t^d = f_1 + f_2 (y_t P_t) + f_3 (rt + p^e)$ ..... (7)

In this study, expected inflation rate, ^{e} is assumed to be determined by the inflation rate in the previous period (P_{t-1}). Hence: $p^e = P_{t-1}$

Substituting equation 7 into equation 6 yields:

$P_t^N = | [m^s_t f- (_1f + _2(Y_t - P_t)f + _3 (r_t + P_{t-1})]$ ... (8)

Hence, substituting equations (8) and (5) into equation (4) the general price level P_t which is inflation can be expressed as:

$P_t = f(e_t, P_t^f, m^s_t, yt P_t, rt, P_{t-1})$ ..... (9) Where

$P_{t \text{ or INF}}$ = General Price level or inflation

$e_{t \text{ or FXR}}$ = Foreign exchange rate

p^f_t = Foreign price level

$m^s_{t \text{ or MS2}}$ = Stock of Money supply

$y_{t \text{ - or}}$ GDP = Real income or Output

$r_{t \text{ or MLR}}$ = Maximum Interest rate

However, some modifications were made to reflect Nigerian peculiarities. Foreign price was omitted as it is assumed to have no significant effect since price of the major export (crude oil) is determined overseas. Furthermore, the core price equation has no fiscal variable. Analysts are of the opinion that government fiscal behaviour in terms of the size of its deficit, and/or borrowing from the banking system are the key driving forces behind the rapid growth in money supply in Nigeria which is predicted to drive inflation. (Agheveli, 1978). Hence a measure of fiscal behaviour of the government was also introduced.

Consequently, leaning on the above explanation, Price model is linearly, expressed in a functional and estimable form as given below using ? as the functional parameter:

$INF_t = f(FXR_t, MS_t, GDP_t, Int_t, GFDS,)$ .....(10)

$INF_t = ?1FXR + ?_2MS_2 - ?_3GDP + ?_4MLR + ?_5GFD + \mu_1$ ..... (11)

For less tedious analysis: equation 11 can be expressed in a natural logarithmic form as:

$\ln INF_t = ?1\ln FXR + ?_2 \ln MS_2 - ?_3 \ln GDP + ?_4 \ln MLR + ?_5 \ln GFDS + \mu_1$.....(12)

Prior expectation: the coefficients of the parameters -$?_1$, $?_2$, $?_4$, and $?_5 > 0$ while $?_3 < 0$

The above equation 12 serves as the analytical framework model for this study, where: GFDS is Government fiscal deficit, μ is error term and other variables remain the same.

Data Presentation and Analysis

This section presents the data, the empirical results and the discussions on the relevant findings from the models developed and tested in this study.

Data Presentation:
Table 4.1 Price Model - Determinants
Level Series OLS Estimation Result

INF. = f(MSP, FXR, MLR, GFDS, GDP)

Dependent Variable: ln INF.
Method: Least Squares
Date: 10/02/13 Time: 07:12
Sample(adjusted): 1981 2012
Included observations: 32 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LnMSP	5.07494	2.09066	2.42742	0.0245
LnFXR	0.60788	0.21121	2.87805	0.0046
LnMLR	1.24742	0.25141	4.96154.	0.0006
LnGFDS	3.00514	1.07016	2.80814	0.0047
LnGDP	-0.07267	0.02173	-3.34312	0.0012
C	12.68552	0.38248	33.16632.	0.0000

R-square	0.737935	Mean dependent var	32.8338
Adjusted R-squared	0.685522	S.D. dependent var	26.7644
S.E. of regression	18.9431	Akaike info criterion	7.7926
Sum squared resid.	720.092	Schwarz criterion	8.0243
Log likelihood	-320.4068	F-statistic	14.
Durbin-Waston	1.4318	Prob (F-statistics)	0792
stat.			0.000009

Source: E-View Econometric Computer Software Application, Version 6

The OLS result as presented in table 4.1 confirms that the explanatory variables - Money supply, interest rate, exchange rate, government fiscal deficits, aggregate income output (GDP) are appropriately signed and so conform to the priori expectation. The coefficient of determination (R-squared) shows that 73 per cent of the variations in inflationary pressure are determined by the combined effect of the changes in these explanatory variables. The F-statistics value of 14.07 is high and indicates that the explanatory variables have collectively made a significant impact on the inflationary tendencies in Nigeria. However, despite these results, a cursory look at the diagnostics tests suggests a possible spurious regression, with the low (Durban Watson) DW-statistics (1.4318) and very high coefficient of determination (73%). which implies time-dependency of these variables. Therefore, there was need for more rigorous tests which justifies looking at the inherent properties of these time series data, by testing for stationary or otherwise.

Table 4.2
Summary of Unit Root Test Result Data Presentation

VARIABLE	AT LEVEL		FIRST ORDER DIFFERENCE		Remarks
	ADF Test Stat	Order of Integration	ADF Test Stat	Order of Integration	
ln(INF)	-2.187927	-	-3.226143	/ (1)	**
ln(GDP)	-1.777078	-	-3.999801	/ (1)	***
ln(MSP)	-2.551252	-	-3.378241	/ (1)	**
ln(FXR)	-1.336185	-	-3.614041	/ (1)	**
ln (GFDS)	-2.223511	-	-6.966956	/ (1)	***
ln(MLR)	-2.259895	-	-5.900253	/ (1)	***
Note:	Critical Value: 1% = -3.6852 5% = -2.9705 10% = -2.6242		Critical Value: 1% = -3.6959 5% = -2.9750 10% = -2.6265		

Source: E- View Econometric computer software application, Version 6

* = 10% level of Significance ** = 5 % level of significance *** = 1 % level of significance

Analysis of Unit Root Test Result

In view of the suspected time-dependent feature of our data in tables 4.1 the Augmented Dickey Fuller (1981) unit root test method was applied separately on all the variables at ordinary level and first order series to determine if they are non-stationary or not. The result shows that the null hypothesis of non-stationarity can only be rejected after the first order differencing /(1) for all the variables at one and 5 per cent levels of significance. This is evidenced by ADF test result at the ordinary level, which shows that the computed negative ADF test statistics for each variable are less than the Mackinnon critical values (Mackinnon, (1991), in absolute term. Thus, the null hypothesis is accepted at level series indicating that the variables are non-stationary. Given the non-stationarity properties of the series, the co-integration test was conducted to confirm further the long-run relationship.

Table 4.3
Summary of Johansen Co-integration Test Result
Sample: 1982 -2012
Included observation: 31
Test assumption: linear deterministic Trend in the data
Series; lnINF, lnMSP, lnFXR, lnMLR, lnGFDS, lnGDP
Lag: interval 1:1

Eigen value	Likelihood	5 Present	1 Percent	Hypothesis
0.990941	243.9047	94.15	103.18	None **
0.821016	189.5475	68.52	76.07	At most 1 **
0.760867	131.38533	47.21	54.46	At most 2 **
0.646830	79.47583	29.68	35.65	At most 3**
0.315627	11.96181	15.41	20.04	At most 4
0.046824	1.342751	3.76	6.65	At most 5

* (* *) denotes rejection of the hypothesis at 5% (1%) significance level. L.R test indicates four(4) co-integrating equation (s) at 5 % significance level
Source: E-View Econometric computer software application, version 6.

Co-integration Result Analysis
The Co-integration estimation result as presented in Table 4.3 shows four (4) co-integrating relations at 5 per cent level of significance. Conclusion is therefore drawn that there is existence of long-run state of equilibrium among the variables used in this estimation. Consequently, in order to get more precise result, the ECM estimation which restricts the long run behavior of these endogenous variables to converge to their co-integrating relationship while allowing a wide range of short-run dynamic was run.

Table 4.4 Parsimonious ECM Result

Dependent Variable: D(ln(INF)

Method: Lea st Squares

Date: 10/02/13 Time: 08:20

Sample (adjusted): 1983 2012

Included observation: 30

Variable	Coefficient	Std. Err or	t-Statistic	Prob.
C	-2.005662	0.488623	- 4.104722	0.0 008
D(ln(INF(-1))	0.635247	0.141660	4.484307	0.0003
D(ln(MSP)	0.069403	0.029164	2.379749	0.0305
D(ln(MSP(-1))	0.007016	0.006735	1.041722	0.3113
D(ln(MSP(-2))	0.042216	0.013212	3.195277.	0.0061*
D(ln(FXR)	0.501457	0.271233	1.848805	0.0883
D(ln(FXR(-2))	0.806182	0.201221	4.006451	0.0005*
D(ln(MLR)	1.681742	0.324534	2.877064	0.0083*
D(ln(MLR(-1))	1.144681	0.726608	-1.575376	0.1384
D((ln(MLR(-2))	1.154867	0.264368	4.368406	0.0003*
D(ln(GDP(-1))	-0.043017	0.029036	-1.481572	0.1489
D(ln (GDP(-2))	-0.025624	0.007028	-3.645987	0.0035*
ECM(-2))	-1.141235	0.270242	-4.223011	0.0004*

R-squared	0.782743		
Mean dependent var	0.008121		
Ad justed R -squared	0.665342	S.D dependent var	0.219422
S.E of regression	0.183644	Akaike info criterion	0.036940
Sum squared resid.	0.835722	Schwarz criterion	0.385246
Log likelihood	-22.44426	F-statistic	12.38095
Du rbin -Watson stat	2.0712Prob	(F-statistics)	0.000412

Source: E-view Econometric Computer Software Application, version 6.

ECM Price Model Analysis

The parsimonious ECM result which is presented in Table 4.4 shows the final and more precise estimation result when compared with OLS model. All the explanatory variables are rightly signed as expected (positive), except the government fiscal deficit which is omitted at this level. This implies that government fiscal deficit is not significant in the short run. The coefficient of determination (R-squared) implies that 78 per cent of the variations in inflationary tendencies in Nigeria is contributed, in aggregate, by the changes in the explanatory variables in the long run. The F-statistic ratio of 12.38 is high indicating that the variables can collectively make a significant impact on inflation. The Durbin-Watson statistics of 2.07 also strongly suggests absence of auto-correlation implying that

the unit root test has been effective in screening the variables to become stationary. This model also shows that 10 per cent increase in aggregate income output (GDP) lagged two periods generates a reduction in inflation rate of approximately 02 per cent. The coefficient of the ECM term (-1.14) which measures the speed of the adjustment is rightly signed (negative) at 5 percent level of significant, and therefore confirms our earlier proposition that the variables are co-integrated. The speed suggests that in the long run, the inflationary pressures in Nigeria adjusts slowly to the disequilibrium changes in the explanatory variables since only 14 per cent of the accumulated disequilibrium in the inflationary tendencies, is corrected within a lag (one year in this study). Overall, the findings suggest that money supply, interest rate, foreign exchange rate, government fiscal deficit, are major inflationary pressure drivers in Nigeria. If GDP is inversely related to inflation, increase in production capacity is expected to dampen the effect of inflationary pressures. These results generally lend support to recent studies by Mordi et al (2007) and Busari (2007) as well as William and Adedeji (2004).

Conclusion

This study attempts to examine the determinants of inflation in Nigeria, using Monetarist Price determination model and applying econometric analysis which include Co-integration, Unit root tests and Error correction Model (ECM) for a period of 33 years (1980 to 2012) using Nigeria data. Overall, the study established that interest rate, money supply, foreign exchange rate, Government fiscal deficit and output income (GDP) are major inflation determinants in Nigeria,

Recommendations

Based on the analysis of the findings, the study recommends

1. The sustenance of increase in production capacity through economic efficiency which will dampen the inflationary pressures.
2. The optimal interest (lending) rate should reflect the overall internal rate of return in the productive sector with due attention to market fundamentals.
3. There is need for fiscal policy initiatives that will channel funds to the productive sector and minimize excess liquidity in the system.
4. Monetary authority should ensure effective coordination of monetary and fiscal policies to avoid counter-cyclical effect.
5. They should also take cognizance of policy lag effect and therefore design monetary policy in line with the expected magnitude of expected changes.

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