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THE IMPACT OF MONETARY AND FISCAL POLICIES ON THE REAL GROSS DOMESTIC PRODUCT OF NIGERIA, 1970-2003

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ABSTRACT

This paper builds and estimates a model of national income (proxied by the gross domestic product, GDP), with a view to testing the impact of monetary and fiscal policies on aggregate demand and economic growth. The estimation technique used is the Error Correction Model (ECM). This approach points to the existence of a long-run equilibrium in the growth of real GDP as a function of money supply, export and other regressors in the period 1970 - 2003. The empirical results tend to suggest non-neutrality of monetary policy while fiscal policy appears to corroborate the

policy ineffectiveness proposition (PIP). From the findings it is apparent that regulatory authorities need a judicious combination of monetary and fiscal policies in order to ensure long-run economic growth.

1. Introduction

Shortly after Nigeria attained political independence in 1960, the economy witnessed a series of changes. At the beginning was its total reliance on agricultural products for export earnings and domestic supplies. Government policy then was directed at the transformation of the economy from agrarian and peripheral economy to an industrially strong one. In fact, government adopted long-term development strategies as reflected in the various national development plans supported with shortrun macroeconomic stabilization policies. However, the discovery of crude oil in commercial quantity shortly after the civil war, in the 1970s, introduced another scenario into the Nigerian economic environment. Export of agricultural products as main source of foreign exchange dampened with oil export taking the unquestionable lead.

Meanwhile, the trend was short lived. The increasing or near total dependence on oil revenue coupled with unpredictable and unprecedented oil price increases in the international market led to structural dislocations and distortions in the economy. This was aggravated by the world recession of 1973/74 and 1979-81.The failure of policies became manifested in slow growth of real output, high rate of unemployment, high domestic inflation, current account deficit, rising domestic public debt, strangulating external debt burden, rural urban drift and mounting social tensions in cities. In an attempt to redress this economic malaise, government embarked on various measures including austerity measures and short-run stabilization policy namely the domestic demand management. By the mid-80s it became apparent to government that there was need for a more comprehensive economic policy package. The Structural Adjustment Programme (SAP) became the policy package expected to redress the shortcomings of policies of the earlier years. Today, the economy is still faced with much the same problems.

Over those decades, however, the authorities made extensive use of annual budgets and successive rolling plans in responding to the state of the economy. It is also useful to emphasize that through the period, major reliance was placed on the use of monetary and fiscal policies. The application of these demand management policies involved the conscious use of a number of policy instruments fiscal, monetary, exchange rates, price, and income policy measures to achieve set targets. (Tomori, 1993).

Reflecting these concerns, the objectives of macroeconomic policy in Nigeria have been directed at full employment of productive resources, price stability, equitable disribution of income, stability of external trade relations and balance of payments equilibrium. In particular, the objectives of monetary policy included the (a) achievement of domestic price and exchange rate stability, (b) maintenance of healthy balance of payments position, (c) development of a sound financial system, and (d) promotion of rapid and sustainable rate of economic growth and development. (Oyejide, 2002).

The objective of this paper is to examine the effectiveness of monetary and fiscal policies in stimulating aggregate demand and growth of the real gross domestic product. Towards this end, the paper in Section 2 discusses the scope and objectives. Sections 3 and 4 contain a review of literature and the theoretical framework. Section 5 provides methodology of analysis. Section 6 presents model estimation and results while section 7 concludes the paper.

2. Scope and Objectives

The main objective of the study is to investigate the relative impact of monetary and fiscal policies on the real gross domestic product. Thus, specific objectives are to:

- quantify the impact of monetary and fiscal policies in stabilizing the Nigerian economy;
- examine the factors affecting the implementation of macroeconomic policies in Nigeria; and

- recommend measures to improve macroeconomic policy management in Nigeria.

The study covers the period of 1970 to 2003. It is limited to monetary policy measures (money supply) and fiscal policy (government spending and taxes), excluding income, price, and industrial policies, amongst others.

3. Literature Review

The literature is replete with the various positions of the mainstream macroeconomics on the impact of fiscal and monetary policies on the real GDP. The mainstreams are notably the Monetarist school, the Neo-Keynesian school and the New-Classical or the rational expectation school. The paper draws heavily on their respective positions.

In terms of policy prescriptions, the new classicals are of the view that real variables are not affected by policy makers. This is the infamous policy ineffectiveness proposition (PIP) result, which argues that no systematic stabilization policy, neither fiscal nor monetary has any real influence on the economy. Only nominal variables, such as inflation, are affected. Policy, they affirmed, can only have a real effect if it is unanticipated.

Following the PIP, many empirical studies have been published either to support or refute the proposition. Mention of some of the authors suffices for this study. They are Friedman Schwartz (1963), Tobin (1970), Sims (1972), Sargent (1976), Barro (1977) and Lucas (1972). In all these papers, the idea was to test the real effects of macro policy on major macroeconomic goals /objectives.In particular, the efforts to empirically test the efficacy of monetary policy could be found in the pioneering works of Friedman and Meiselman (1963) and Anderson and Jordan (1968). The latter, as mentioned by Bogunjoko (1997) is popularly referred to as St. Louis Model. Friedman and Meiselman used reduced form model of disaggregated Keynesian income-expenditure framework to argue that consumption, C, and private investment, PrI, are determined by money supply, M_t, and the fiscal policy is

represented by government expenditure and net exports, A_t.

In the context of the Nigerian economy, there exist a certain number of empirical studies on effectiveness of monetary and fiscal policy, including those of Ajayi (1974), Ubogu (1985), Aigbokan (1989) and Tella and Omitogun(1989). Specifically Uba (1989) used the Barro model on Nigerian data for the period 1965 to 1985 and found support for monetary neutrality.

Odedokun (1988) examined impacts of systematic and surprise components of monetary policy on data of inflation and four categories of real output namely the manufacturing output, real estate and construction output, and real GDP less primary production and overall real GDP. His result contradicted the monetary neutrality hypothesis. In effect, he found out that anticipated monetary growth significantly influenced real variables, unanticipated monetary growth affected inflation only and also that inflation uncertainty had no perceptible influence on real variables.

In the case of the study by Anyanwu (1993) money supply, M2, and GDP were variables considered over the period 1970-1988 on both open and closed variants of the Nigerian economy. His result showed that rational expectation received support for only prize level and not output thereby confirming Odedokun (1988) findings. However, the monetary neutrality did not receive any support for both output and prize level in another study by Anyanwu (1994). Saibu (2004) maintained that the policy implication of this result according to Anyanwu is that the government has been adopting " a trickery" monetary policy in recent times, implying time inconsistency or incredibility in policy design and implementation. He concluded that such trickery measures are hard to sustain in fighting unemployment in Nigeria; other measures must be designed. This conformed to rational expectation proposition.

Still in the same vein, Ogungbenro and Amekeodo. (1995) examined the effects of monetary policy on unemployment. They modified the Barro (1977) and Wogin (1980) techniques and specified unemployment as a function of money supply, government expenditure and export earnings. They concluded that monetary policy

affected unemployment. However, it was observed that their result may be misleading in view of the fact that their lag length was arbitrary and they used rational expectation model without the underlying assumptions.

Another major investigation of the impact of monetary and fiscal policy as stabilization policies in Nigeria was that by Olaloye and Ikhide(1995). In the study, they examined the Nigerian experience at using demand management policies to stimulate the real economic activities and the effectiveness of monetary and fiscal policies. They specified a modified St. Louis Equation. In it domestic output was regressed on money supply, M1 and M2, government expenditure (and planned fiscal deficit); net export and monthly savings. Period of estimation was 1986 through 1991. Adequate measures were taken on the choice of the lag length and estimation technique. They concluded that though fiscal policy is more potent, a proper mix of these policies may be more appropriate. It should be stated that the findings of Olaloye and Ikhide are constrained by the very short period of estimation, 1986 through 1991. The period coincided with the SAP era. The study was silent on the economic situation before or after the SAP.

Nwaobi (1993) used an open economy rational expectation model in which imported intermediate goods were accorded an important role. He adopted the model by Chopra and Montiel (1986). He also assumed that domestic production depended on the imported intermediate goods and a fixed exchange rate where there was both price and quantity control on trade. He then tested the PIP hypothesis based essentially on Cochrane Orcutt iterative procedure. The findings of this study provided evidence in support of rational expectation hypothesis in Nigeria. His conclusion was that only unanticipated components of externally induced price changes caused domestic output to deviate.

Saibu (2001) conducted an empirical research on the effect of monetary policy on real industrial output and price levels in Nigeria. The study also involved the verification of the relevance of the economic agents expectation on the effectiveness of monetary policy neutrality postulate in Nigeria. The result indicated that systematic and surprise components had different implications for the impact of

monetary policy. The result provides some support for the monetary policy ineffectiveness proposition, (PIP), in Nigeria.

In a recent paper, Oyejide (2002) attempted to show the importance of monetary policy and its effects on the economy. His work, though non empirical being based on analytical narratives identified the constraints against the effectiveness of monetary policy in the economy. He observed that fiscal deficit and financing as well as monetization of foreign assets have significant implications for monetary policy and its effectiveness. He opined that for monetary policy to be effective, the monetary authorities should, as a matter of fact, exercise policy instrument independence, free from the obligation to finance any aspect of government spending and must possess an adequate understanding of the dynamics of a modern economy.The above survey is a pointer to the current state of the debate on the impact of monetary and fiscal policy in Nigeria. "The doubts over the outcome of some of these studies due to their methodology make further investigation imperative." (Saibu, 2004). Consequently, this study attempts to add value to the empirical content of the ongoing debate.

The approach adopted in this paper is the Neo-Keynesian IS-LM apparatus as proposed by Hicks (1937) and Hansen (1949). At the outset is the Keynes' model which has as its outstanding characteristics that full employment of labour is not automatic and that the volume of employment at a point in time is in part determined by monetary and fiscal policies. This position is in sharp contrast to the features of the classical model.

Therefore, in modeling the impact of fiscal and monetary policy on the Nigerian economy, it is necessary to set the objective of policy, identify the instrumental and intermediate variables and the desired target of the policy variables. In what follows, we shall attempt to address this concern.

4. Methodology

Based on the IS-LM framework the paper tests the proposition that: in economics mainstream monetary and fiscal policies are useful and monetary policy is

transmitted through interest rate. The paper proposes to use the aggregate demand approach in the modeling.

Under the IS-LM approach, there is the consensus of opinion that Keynesian analysis applies when the economy is in depression and Neoclassical analysis is more appropriate during inflation or boom. Levacic and Rebbman (1989), posit that the basic specification of the goods and money market and hence the aggregate demand schedule are the same both in the Neoclassical and Keynesian versions of the model. The only difference in the two approaches lies in their specification of the supply side of the economy.

However, this study is focused on the specification of the aggregate demand function since it is intended to examine the impact of macroeconomic policies on aggregate demand. The latter is derived from the IS-LM functions. The IS function defines the locus of the various combinations of the level of income and interest rate at which the goods market is in equilibrium. The LM curve, on the other hand, depicts the locus of the combination of interest rate and level of income at which the money market is in equilibrium. The aggregate demand function defines the pairs of price and output combination at which both goods market and the money market are in equilibrium. Since the real quantity of money is affected by price level, this implies that as the price rises, the real money balances will decline. When this occurs, the demand for money falls as a result of the shift in LM curve to the right. Consequently, the level of output is increased, while the real interest rate falls.

In this analysis, the external sector is incorporated. In effect, the Nigerian economy is highly sensitive to developments in the external sector. Thus, the trade surplus or net export appears as a component of domestic demand for output and is expected to have effect on monetary and fiscal policy.

Given the preceding discussion, the IS curve in an open economy, can be specified as follows:

$$IS = r_g = f_1(G, T, X, IM) \qquad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(1)$$

where r : rate of interest at which the real sector of the economy is in equilibrium.

g : government expenditure which is exogenously determined.

T : Tax function which is a function of the level of income.

IM : imports of goods and services which depend on the level of income and the exchange rate.

X : exports of goods and services which are also assumed to be exogenously determined.

The level of income, Y, which is implicit in equation (1) can be made explicit by incorporating it in the equation thus:

$$IS = r_g = f_2(Y, G, T, X, IM) \qquad \text{.......................................(2)}$$

In equation (2), G, T, X and IM are regarded as shift variables in the sense that a change in any of them will cause the IS curve to shift either outwards or inwards. However, when these variables are held constant, movement along the curve will cause r and Y to either increase or decrease. It could be shown analytically that the IS curves slopes downwards.

To derive the LM curve, we equate the money demand function to its supply. We shall also assume that the monetary authority, CBN, exogenously determines the quantity of money supply such that

$$\frac{M^d}{P} = \phi(Y, r) \qquad \text{...(3)}$$

And

$$M^s = M^d \qquad \text{..(4)}$$

Substituting equation 4 into 3 and injecting the definition of the LM curve, then it follows that:

$$LM = r_m = f_3(Y, M^s, P) \qquad \text{...(5)}$$

where

r_m : rate of interest at which the money market of the economy is in equilibrium

Y : level of output;

M^s: level of money supply;

P : Rate of change of the price level.

In equation (5), M^s and are the shift factors while an increase or decrease in r_m brought about by change in Y when other factors are held constant leads to a movement along the LM curve. This curve slopes upwards.

In solving the model, we adopt the strategy of collapsing equations (2) and (5) into one equation by elimination the interest rate, r, and expressing the result as aggregate demand, Y, as a function of all the other variables, G, T,X, IM, M^s, P. The aggregate demand curve is derived by allowing the price level to vary at the existing equilibrium. The new model becomes:

$$AD = Y = f_4(G, T, X, IM, M^s, P) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (6)$$

The variables are as defined previously and the expected signs are such that

$$\frac{\partial Y}{\partial \bar{G}} > 0; \quad \frac{\partial Y}{\partial T} < 0; \quad \frac{\partial Y}{\partial \bar{X}} > 0; \quad \frac{\partial Y}{\partial IM} < 0; \quad \frac{\partial Y}{\partial M^s} > 0. \quad \ldots\ldots\ldots\ldots\ldots\ldots (7)$$

Equation (6) contains five policy variables which the authorities can manipulate in order to control the level of aggregate demand. In effect, the fiscal authorities can change the government expenditure (G), or rate of taxation to affect volume of tax (T), while the monetary authorities can adjust money stock. However, both fiscal and monetary authorities can adjust export and import that is net export, either through the combination of fiscal, monetary and exchange rate policies.

By assuming homogeneity of degree one in price level, P, equation 6 can be re-written as:

$$AD = Y = f_5(G, T, X, IM, M^s) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (8)$$

where

r_m : rate of interest at which the money market of the economy is in equilibrium

Y : level of output;

M^s : level of money supply;

P : Rate of change of the price level.

In equation (5), M^s and are the shift factors while an increase or decrease in r_m brought about by change in Y when other factors are held constant leads to a movement along the LM curve. This curve slopes upwards.

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$$\frac{\partial Y}{\partial \bar{G}} > 0; \quad \frac{\partial Y}{\partial T} < 0; \quad \frac{\partial Y}{\partial \bar{X}} > 0; \quad \frac{\partial Y}{\partial IM} < 0; \quad \frac{\partial Y}{\partial M^s} > 0. \quad \ldots\ldots\ldots\ldots\ldots (7)$$

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By assuming homogeneity of degree one in price level, P, equation 6 can be re-written as:

$$AD = Y = f_5(G,T,X,IM,M^s) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (8)$$

5. Model Estimation and Results

5.1 The Model

Equation (8) represents the implicit form of our model. However, we have to determine the mathematical form of the equation. This will pave the way for estimation and appropriate interpretation of the estimated parameters.

From theoretical underpinnings a change in any of the policy variables does not provoke proportional change in the aggregate demand. They tend to show that there is non- equiproportional relationship between the dependent variable and the explanatory variables. Consequently, we adopt the nonlinear formulation for equation (8) and assume a generalized Cobb-Douglas type function such that the equation can be explicitly specified as:

$$Y_t = \alpha_0 . G_t^{\alpha_1} . T_t^{\alpha_2} . X_t^{\alpha_3} . IM_t^{\alpha_4} . MS_t^{\alpha_5} . e_t \qquad \ldots\ldots\ldots\ldots\ldots\ldots\ldots (9)$$

Where $\alpha_1 \succ 0$; $\alpha_2 \prec 0$; $\alpha_3 \succ 0$; $\alpha_4 \succ 0$ $\alpha_5 \succ 0$.

e_t : multiplicative random term.

For the purpose of estimation, equation (9) can be log-linearised such that the equation to estimate becomes:

$$LogY = \log(\alpha_0) + \alpha_1 \log G_t + \alpha_2 LogT_t + \alpha_3 LogX_t + \alpha_4 \log IM_t + \alpha_5 LogMS_t + v_t \qquad (10)$$

Or using the lower case letters for the logarithmic transformation in equation (10), then $y_t = \alpha + \alpha_1 g_t + \alpha_2 t_t + \alpha_3 x_t + \alpha_4 im_t + \alpha_5 ms_t + v_t$

$$y_t = \alpha + \alpha_1 g_t + \alpha_2 t_t + \alpha_3 x_t + \alpha_4 im_t + \alpha_5 ms_t + bDM1 + cDM2 + v_t \quad (11)$$

Where $\alpha = \log \alpha_{t \text{ and }} v_t = \log e_t$

and v_t is such that $E(v_t) = 0$; $E(v_i\, v_j) = \sigma^2$ for $i = j$ and $E(v_i\, v_j) = 0$ for $i \neq 0$. That is the white noise has a normal distribution, mean value of zero, constant variance σ^2, and no autocorrelation of errors. Finally, we have introduced into the equation to be estimated two dummy variables in line with Bogunjoko (1997) such that :

DM1: oil dummy which takes value 1 during oil boom and 0 if otherwise;

DM2: SAP dummy which takes value 1 during SAP era and O if otherwise.

Incorporating these two qualitative variables in equation 11 becomes the equation to be estimated. This is as follows:

$$y_t = \alpha + \alpha_1 g_t + \alpha_2 t_t + \alpha_3 x_t + \alpha_4 im_t + \alpha_5 ms_t + bDM1 + cDM2 + v_t \quad (12)$$

5.2 Data Measurement

This study covers the period of 1970-2003. Data used in the estimation were obtained from the **Annual Report and Statement of Accounts** of the Central Bank of Nigeria, CBN, various issues. All the variables used in the study were real variables obtained by dividing the nominal values of the variables by the consumer price index at 1984 constant prices.

We could also envisage a disaggregated model taking into consideration the major components of the gross domestic product notably agriculture, industrial, building and construction, wholesale and retail trade and services. Such detailed analysis should enable us capture the effect of fiscal and monetary policy on the different sectors of the economy. Data for those sectors could also be obtained from the CBN sources.

In the estimation, aggregate demand is proxied by the gross domestic product, government expenditure and taxes while money supply is represented by the narrow

money supply M1 or broad money supply, M2.

The following are the definitions of the variables used in the model:

y : natural logarithm of real GDP;

g : natural logarithm of government expenditure;

t : natural logarithm of taxes;

x : natural logarithm of real exports;

m : natural logarithm of real imports;

ms1 : natural logarithm of narrow money supply;

ms2 : natural logarithm of broad money supply;

fd : natural logarithm of fiscal deficit given as (LogT LogG);

dc : natural logarithm of domestic credit;

Doil : dummy variable on oil vagaries;

Dsap : dummy variable on Structural Adjustment programme.

5.3 Estimation

5.3.1 Estimation Technique

The nature and scope of this study is indicative of the fact that it is a long-term phenomenon. It is, in effect, apposite to use a more appropriate method in the estimation of changes in the growth of real GDP. Thus, the error correction model, ECM, becomes more appropriate than the usual multivariate regression analysis,

provided certain conditions are met. This ECM examines the time series properties of the data, overcome the problems of spurious correlation often associated with non-stationary time series data, and generate long-run valuable relationships simultaneously (Engle and Granger, 1987; Hendry, 1986).

However, in using ECM, it is important to commence by assessing the validity of its application particularly the order of integration of both the dependent and independent variables in the model. This criterion, order of integration, ascertains the number of times a non-stationary variable will be differenced to arrive at stationarity. Dickey Fuller (DF), Augmented Dickey-Fuller (ADF) and Sargan-Bhagarva-Durbin Watson (SBDW) are popular statistics used for this purpose.

As contained in Bogunjoko (1997), the DF and ADF are tests for the null hypothesis that the variables of interest are non-stationary, that is, the order of integration is one.1(1)

Once the order of integration is determined, the next step is to generate an error correction model (ECM). The test of cointegration is carried out by using Engle and Granger two-step method (Engle and Granger, 1987). It is worthy to recall that cointegration is a test of stationarity of the residuals generated from running a static regression in levels of one or more of the regressors on the dependent variables. The DF and ADF are used in the test procedure. In this study, we relied on the ADF test.

5.3.2 Augmented Dickey Fuller Test for a Unit Root

Of interest is to test if the variables are I(0) or I(1) series, that is, if they are stationary or non-stationary, respectively. According to Engle and Granger (1987), a linear combination of two or more non-stationary linear combination series may be stationary. Thus, the stationary linear combination is called the cointegrating equation and may be interpreted as a long-run equilibrium relationship between the variables. In order to test the stationarity time series properties of the variables used in the model, the paper has adopted the Augmented Dickey-Fuller (ADF) test. Both the variants with intercept and the other with trend and intercept were used. All variables

are as defined in subsection 6.2. The result obtained is found in Table 1.

The ADF test strongly support the hypothesis that most of our variables are I(1) series, that is, non-stationary. This agrees with findings in similar studies (Olopoenia, 1992). The series were differenced once in order to make them I(0) series. There was a case of I(2) series; the narrow money supply, MS1. This was differenced twice to obtain stationarity. Bogunjoko (1997) had I (2) series for M1, M2, GDP, foreign reserve, exchange rate and domestic credit to the private sector.

From the above, it may be concluded that any dynamic specification of the model in levels of the series is likely to be inappropriate and may be plagued by problems of spurious regression (Adams, 1992: 25). In the same conclusive manner, Bogunjoko remarked that econometric results of model in levels of the series may not be ideal for policy making. This further justifies the use of ECM in this study.

Table 1: Test of Order of Integration

Variables	ADF Test		Decision
	With Intercept	Intercept & Trend	
y	-2.7659	-2.9179	I(1)
Δy	-4.6683	-4.5820	I(0)
g	-3.0108	-2.9328	I(1)
Δg	-3.6548	-3.5841	I(0)
t	-2.1995	-2.2742	I(1)
Δt	-4.8256	-4.6943	I(0)
x	-2.1561	-2.7743	I(1)
Δx	-5.2905	-5.1922	I(0)
im	-1.7450	-2.1614	I(1)
Δim	-4.0556	-3.9814	I(0)
fd	-3.4190	-3.4847	I(1)
Δfd	-5.6502	-5.5452	I(0)
Ms1	-2.4323	-2.4914	I(2)
Δms1	-3.0418	-2.9773	I(1)
ΔΔms1	-5.8745	-5.7832	I(0)
Ms2	-2.6864	-2.7079	I(2)
Δms2	-3.2296	-3.1657	I(1)
ΔΔms2	-5.8745	-5.7832	I(0)
dc	-2.5711	-2.7574	I(1)
Δdc	-5.6275	-5.5335	I(0)
cpi	-0.2968	-2.4750	I(1)
Δcpi	-3.7492	-35891	I(0)
Critical Value @ 5% level:			
Level	-2.9558	-3.5562	
1st Difference	-2.9591	-3.5614	
2nd Difference	-2.9627	-3.5670	

Table 2: Identification of Cointegrating Equations

Equation	Variables								
	Y	G	T	X	M	FD	MS1- 1	MS2 1	DC
1	✓	✓	✓	✓	✓	–	✓	–	–
2	✓	–	✓	✓	✓	✓	✓	–	–
3	✓	✓	✓	✓	✓	–	✓	–	–
4	✓	–	✓	✓	✓	✓	–	✓	–
5	✓	✓	✓	✓	✓	✓	✓	–	–
6	✓	✓	✓	✓	✓	–	–	–	✓

Note: ✓ Sign indicates variable included in the equation
-- Sign indicates variables not included in the equation.

Table 3: Cointegration Test

Equation	Eigenvalue Statistics Under Ho: rank = r			Likelihood Ratio Under the Ho: rank =r		
	r = 0	r ? 1	r ? 2	r = 0	r ? 1	r ? 2
1.	0.747924	0.6979300	0.559606	134.3119	90.21512	51.90802
2.	0.752120	0.698866	0.558903	134.8850	90.25109	51.84469
3.	0.756681	0.701627	0.549286	136.6297	91.40146	52.70032
4.	0.757442	0.705723	0.549532	137.1811	91.85265	52.70917
5.	0.822090	0.728611	0.621807	173.4509	118.20360	76.46917
6.	0.767063	0.699757	-	131.2864	83.20580	-
Critical Values						
@ 5% level				94.15	68.52	47.21
@ 1% level				103.18	76.07	54.46

5.3.3 Test for Cointegration

In justifying the use of ECM it was necessary to carry out a cointegration test among the variables which are in themselves non-stationary. In doing this, we specify six static model of changes in GDP and different combinations of regressors with a view to determining the number of cointegrating relations. The variables included in each equation are shown in Table 2. The result of the exercise is shown in Table 3.

In effect, the Table displays the EViews results of the critical values for the trace

statistic (Likelihood Ratio test statistic) as reported in Osterwald-Lenum (1992). The LR test indicates three cointegrating equations at 5 percent significance level or better for equations 1 to 5. For the last equation, the LR test points to only two cointegrating equations. The paper therefore concluded that there is cointegration relationship between changes in GDP and the other I(1) series. Thus, the existence of long-run equilibrium relationship between these variables is established. An ECM of changes in growth of GDP, was then specified.

5.4 Results

The objective of this study is to evaluate the effectiveness of fiscal and monetary policy in the Nigerian economy. The study was thus conceptualized as the growth of the economy (measured by the GDP) conditional on fiscal and monetary policies implementation. In this regard, alternative specifications were adopted as shown in Table2. And given the conclusion in subsection 6.3.3 the ECM was specified and run using the EViews software package. The result is as shown in Table 4. However, before evaluating the model, it was necessary to carry out a diagnostic test.

5.4.1 Diagnostic Test

The need for diagnostic testing has been reiterated in the literature. According to Davidson and Mackinnon (1985) it is only from a model that appears to be consistent with the data that one can hope to make valid inferences. In the same breadth, Olomola (2002) opined that "diagnostic tests are important in the assessment of the adequacy of a model". Diagnostic tests are therefore essentially issues of specification and evaluation of the statistical appropriateness in the estimation of the technique.

In effect, three assumptions are fundamental to our model specification notably normal distribution, homoscedasticity and non-autocorrelation of errors. The lower panel of Table 4 shows the statistics used in verifying these assumptions.

Thus, for the assumption of non-normality distributed error the test statistic proposed is Bera and Jarque (1980) test. The BJ statistic was smaller than the critical value of

5.991 at the 5 percent significance level. Thus, the test was unable to reject the null hypothesis of normality of the regression residuals.

The second assumption concerns the homoscedasticity of the errors, that is, the errors have a constant variance. Presence of heteroscedasticity in the disturbance term renders the estimates inefficient and the standard error invalid. Breusch- Pagan (1979), White (1980), ARCH test of Engle (1982). "The results of the Chi-square version were significant at 5% level and have rejected the ARCH form of heteroscedacity.

The Durbin-Watson (DW) statistic is the standard statistic for testing the presence or otherwise of autocorrelation of errors. The D.W statistics for the six equations are shown in Table 4. These values indicated no evidence of first-order autocorrelation for all the equations.

In testing for omitted variable and functional form mis-specification, the paper used the Ramsey (1969) RESET (Regression Specification Error Test). The resultant F-statistic was insignificant suggesting that evidence of omitted variables and functional mis-specification was not detected.

5.4.2 An Error Correction Model of Changes in RGDP

Equation 11 is the final model to which some variables were either included or omitted. A complete description of the estimated equations is contained in Table 4.0. The models track well the ECM proposition. In all the equations, the error correction term, ecm (-1), has a negative sign as expected. They also have a large feedback effect between 73 and 93 percent of previous year's discrepancy between the actual and the long-run equilibrium value of real GDP. These figures also represent the response of the policy shocks within contemporaneous period of time.

Table 4: An Error Correction Model of Changes in RGDP

Variables	EQUATIONS					
	1	2	3	4	5	6
C	0.004305 (0.242616)	0.004325 (0.243645)	0.004820 (0.280071)	0.004889 (0.283687)	0.004412 (0.241030)	0.011284 (0.602173)
ΔLRT	0.173563 (1.431442)	0.171177* (2.036285)	0.219919 (1.762071)	0.178085* (2.145568)	0.109421 (0.052783)	0.055054 (0.718550)
ΔLRG	-0.002996 (-0.040686)	---	-0.042285 (-0.571055)	---	0.069107 (0.032900)	0.044702 (0.760256)
ΔLRX	0.278021* (3.487412)	0.277235* (3.438339)	0.251500* (3.143474)	0.251163* (3.102463)	0.268899* (2.94494)	0.270877* (4.361759)
ΔLRM	-0.060449 (-1.159569)	-0.060096 (-1.147916)	-0.034693 (-0.711316)	-0.034533 (-0.704122)	-0.056016 (-1.001184)	0.022955 (0.472318)
ΔLMS1(-1)	0.294971* (2.932732)	0.294663* (2.931815)	---	---	0.293088* (2.856664)	---
ΔLMS2(-1)	---	---	0.343069* (3.539290)	0.342333* (3.535153)	---	---
ΔLFD	---	0.003482 (0.046684)	---	0.042112 (0.561165)	0.076883 (0.036138)	---
ΔLDC	---	---	---	---	---	-0.011832 (-0.389969)
DOIL	0.001069 (0.049132)	0.001106 (0.050849)	-0.000345 (-0.016505)	-0.000391 (-0.018689)	0.015710 (0.070872)	0.000285 (0.012810)
DSAP	-0.006725 (-0.328535)	-0.006763 (-0.330301)	-0.008498 (-0.426142)	-0.008572 (-0.429247)	-0.007061 (-0.334577)	-0.012621 (-0.587556)
ECM(-1)	-0.923190* (-3.290118)	-0.924942* (-3.283729)	-0.983744* (-3.414621)	-0.983999* (-3.401397)	-0.946628* -3.171864	-0.728906* (-3.563593)
R^2	0.862420	0.862471	0.871643	0.871557	0.863562	0.853633
Adj. R^2	0.814566	0.814635	0.826997	0.826882	0.807746	0.804844
F-Statistic	18.02192	18.02970	19.52350	19.50852	15.47170	17.49644
SSR	0.023660	0.023651	0.022074	0.022089	0.023464	0.025252
DW	1.827003	1.827236	1.874037	1.874833	1.845288	1.766782

Note: Figures in brackets are t-statistics; * indicates statistical significance @ 5% level.

The coefficient of the real export variable has positive sign and plausible magnitude in all the equations. This means that over time, exports explain the growth of the real GDP in Nigeria. This is not surprising as the total exports (oil and non-oil) account for a large proportion of the economic activities in the country. When these coefficients are viewed as elasticities, then they indicate export inelasticity of the real GDP.

Similarly, the real narrow definition of money supply (MS1) has correct sign and significant at 5 percent level in equations 1, 2 and 4. It's lagged value of order one was used following findings in Bogunjoko (1997) and Oyejide (2002). The broad

definition of money supply (MS2) was also significant at 5 percent level of significance in equation 3 and 4. This result shows clearly that monetary policy was effective over the period of study.

Consequently, this result implies that money matters in our economy (non-neutrality of money postulate). These results corroborate to those of Bogunjoko (1997) and Oyejide (2002). However, the transmission is not within the scope of this paper. We could not ascertain "that monetary policy actions affect the economy primarily by determining aggregate spending which, in turn, directly affects the production of goods and services and, hence, the unemployment and inflation rates". It should be noted that when the domestic credit, dc, to the private sector was included as in equation 6, the result was not encouraging.

Three variables were introduced into the model to capture the effectiveness of fiscal policy. These are taxes, government expenditure and fiscal deficit. The coefficient of tax variable is significant at 5 percent level in only two equations implying that fiscal policy was effective. However, in all the equations, government expenditure, g, and fiscal deficit (fd) were never significant statistically implying ineffectiveness of fiscal policy. Olaloye and Ikhide (1995) had concluded that fiscal policy was effective. Our conclusions though contradictory to those of Olaloye and Ikhide are plausible in the Nigerian case, given the period of estimation. In effect, rising volume of taxes could have led to changes in real GDP while growth of g and fd merely reflected increasing administrative /current expenses of government. The latter is to the detriment of capital expenditure which has higher propensity to cause real GDP growth.

The coefficient of real import carries a negative sign contrary to prediction but statistically insignificant in all cases. The theoretical underpinning indicates a positive relationship between imports and changes in real GDP. This result correctly translates the situation in the Nigerian economy. In effect, most of our imports are finished consumer products while a negligible proportion is meant for intermediate and capital goods. This way, partly, explain the wrong sign.

Finally, inclusion of dummy variables (DSAP and DOIL) was designed to capture the

effect of policy /price shocks on the real GDP over the period of study. This is equivalent to administering a Chow test for the stability of the coefficients. However, our model failed to detect a shift in intercept since the coefficient of DSAP and DOIL were statistically insignificant in the equations. These results are contrary to those of Bogunjoko (1997) who found that DSAP and DOIL were statistically significant. It was also noted that the intercept terms were not significant and the magnitudes were very low. It is possible that the initial shocks due to these policy shifts were temporary having a weak long term effect on the economic activities.

6. Conclusion

In this study the paper has attempted to evaluate the effectiveness of fiscal and monetary policy in Nigeria. It built a model around the IS-LM framework of the Keynesian School.. The augmented IS-LM curve was designed to include all pertinent variables which could explain the real growth of the GDP, given the scope of the study. Also included in the model were policy shock (SAP) and International oil price shocks. Concerned about the possibility of spurious regression and therefore invalidating of estimated coefficients for policy analysis, the paper adopted the cointegration technique.

From the empirical analysis, it could be inferred that money matters in Nigeria and that the appropriate monetary target is the money supply (both narrow and broad) but with lag of one year. This seems to contradict the PIP of the rational expectation's school and suggests the non-neutrality of money in the Nigerian economy. The result also appears to indicate the ineffectiveness of domestic credit to the private sector. This finding requires further details.

Government taxes seemed to be effective whereas government expenditure and fiscal deficit tend to agree with the PIP. It is possible (theoretically) that there exists a relationship between money supply and fiscal policy variables, although our model failed to capture this. In effect money supply to an extent responds to government expenditure streams or to fiscal deficit.

Further, the paper found that growth of the real export contributed, in a significant

manner, to the growth of the real GDP although with an elasticity in the interval of 25 and 28 percent. In terms of this elasticity, it means our real GDP is export inelastic. This is not contrary to our expectation particularly in a monocultural economy that depends almost solely on export of crude oil. In the same vein, the coefficient of import suggests a theoretical expectation although it is not alien to the Nigerian economy.

Finally, the shock variables, DSAP and DOIL seemed not to have contributed, significantly, to the real GDP over the period. These variables might have had short-run effects but the estimating model failed to capture their long-run impact on the growth of the economy.

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