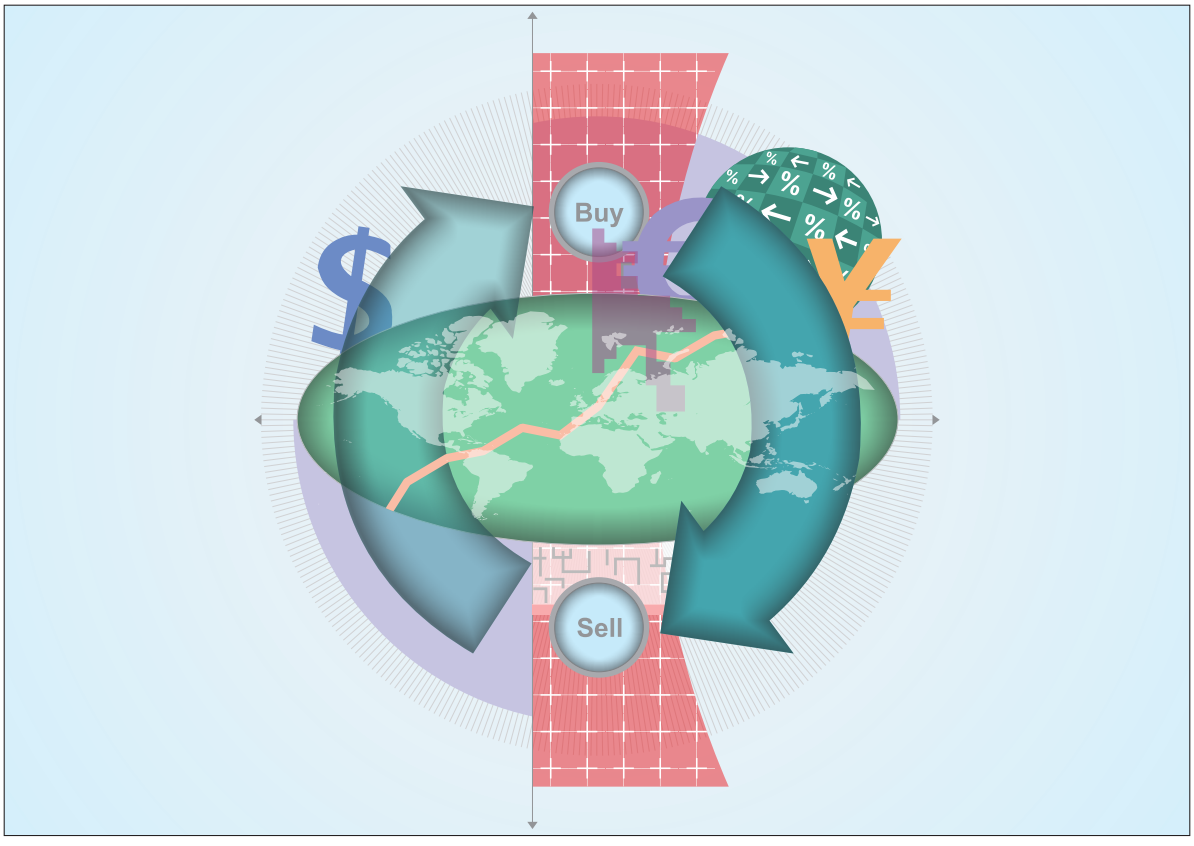

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Asymmetric Policy Shocks and Real Output Fluctuations in Nigeria (1960-2004)

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Abstract: This study investigates the asymmetric effects of monetary and fiscal policies on the real output growth in a small open economy. It is a country-specific, time series study that verifies whether there is difference in the effect of expansionary and contractionary policy shocks on real fluctuations in Nigeria. A modified GARCH model was used to assess the asymmetric effects of policy shocks on real aggregate and sectoral output measures. The empirical results showed that the level of aggregation also had implication of the asymmetric effects of fiscal and monetary policy shocks in Nigeria. Another important observation was that monetary policy in most of the output measures was negative and insignificant, but the fiscal policy had asymmetrical positive effects in most cases. This implies that in an open Nigeria economy, fiscal and monetary policies were not symmetrical in effects on real output growth; expansionary monetary and fiscal policies generally were found to reduce output growth while contractionary policies of both monetary and fiscal had boosted on output growth in Nigeria. This is in consonance with earlier works in this area. The policy implication of the finding is that to attain sustainable real growth, appropriate policy mix should be designed and implemented.

Key words: Asymmetric effects, policy shocks, real fluctuations

INTRODUCTION

Recent studies on the New Classical macroeconomic proposition have demonstrated that it is not enough to establish whether unanticipated policy has real effects or not, but the most significant contribution from such studies would be to find out whether the real effects of the macroeconomic policies are asymmetric or not (Ranjit, 2002). Cover (1992) pioneered another attempts to investigate whether the distinction of policy shocks into positive and negative (i.e., expansionary and contractionary policy) has implication on the policy output interactions. Using data for the US from the period 1951-quarter one to 1987 fourth quarter, he found that policy contractions reduced output more than the policy expansions raised it. Karrass (1996a and b), Karras and Stocks (2004a and b) using cross countries data came out with similar conclusion. The asymmetric hypothesis had been further confirmed by several other studies on developed economies (Holmes and Wang, 2000; Demery and Duck, 2000; Senda, 2001; Parker and Rothman, 2004; Hoppner *et al*., 2004). It is believed that extending the investigation to developing countries, by checking whether this asymmetric effect is a Nigerian phenomenon, will be an empirical novelty in understanding the dynamics in development macroeconomics.

Apart from the above reasons, this research is distinct from any previous attempts at examining the effects of policies on real economic activities in Nigeria, in many other ways. First, it takes a more comprehensive definition of real output. It considers output at the four basic economic activity levels: Aggregate, primary, secondary and tertiary level of economic activities. Output response to policy

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may not be symmetric among the sectors, so specific sector analysis was also done in this study. This indeed provides a basis for appreciating more deeply the differential effects of policy in the economy. It also applies Generalized Autoregressive Conditional Heteroskedastic (GARCH) approach to decompose policy and opeuness shocks (into anticipated and unanticipated) and utilizes the Vector Error Correction Mechanism (VECM) to analyse the output response to policy shocks as against the Two Stage Least Square (TSLS) method popular among the previous studies, which has been found to be inefficient (Jha and Donde, 2001). It is believed filling these empirical gaps is an invaluable addition to existing empirical evidence on the Development Macroeconomic analysis using Nigeria as the case study. Thus providing empirical foundation for designing appropriate policy strategy to promote and sustain economic growth in a developing economy like Nigeria.

MATERIALS AND METHODS

Extracting Unanticipated Policy Shock

Following Afxentiou and Serletis (2000) and Saibu (2006) the GARCH methodology, which has emerged as a more appropriate measure of the unanticipated shocks is used to decomposed the policy shocks to anticipated and unanticipated policy shocks and also to positive and negative shocks. Several studies have also demonstrated the versatility of the GARCH approach in measuring shocks. For instance and Musonda (2001) had used it to measure exchange rate volatility. Let p_t be the growth rate of the policy variables with the conditional forecast $E(p_t/\Omega_{t-1})$ as indicated in the following equations:

$$p_t = E(p_t/\Omega_{t-1}) + \varepsilon_t \quad (1)$$

Where, Ω_{t-1} is the conditional information set on which forecasts are based and the forecast error ε_t has zero mean and conditional variable given by $E(\varepsilon^2_t/\Omega_{t-1}) = \delta^2_t$.

The concern here is to use conditional shock model to capture the time-dependent heteroskedastic distribution of ε_t. By capturing this feature of the variables series, we can produce a forecast variance δ^2_t along with a growth forecast error ε_t such that the standardized residnals ε_t/δ^2_t are homoskedastic and independent. Among the several conditional shock model that have been proposed for capturing time dependent heteroskedastic distribution, the most popular are members of Engle's (1982) Autoregression Conditional Heteroskedastic (ARCH) function. One of such model, widely used in the literature is Bollerslev's (1986) generalized ARCH (1,1) or GARCH (1,1) systematic shocks model:

$$\delta^2_t = \beta_0 + \beta_1 \varepsilon^2_{t-1} + \beta_2 \delta^2_{t-1} + u_t ; \beta > 0\ \beta_1 > 0\ \beta 1 > 0 \quad (2)$$

This model allows the conditional variable of ε_t to be an autoregression moving average, ARCH (1,1) process and harbour especially cases of a variety of other models, including the Engle's (1982) ARCH ($\beta_1 = 0$) and Bollerslev's (1986) integrated GARCH ($\beta_1 + \beta_2 = 0$) model. Within the context of this model the estimation δ^2_t is the conditional variance of the growth rate of the policy and opeuness measures, that is, the variability of the growth rate of policy and openness measures expected to prevail (next period) given currently available information. The unexpected component of growth given by:

$$e^*_t = \mu_t - \mu^*_t \quad (3)$$

Where, $\mu^*_t = E(\mu_t/\Omega_{t-1})$ is the conditional expectation of μ_t. In this expression, ε_t does not reflect changes in conditional variance over time. A measure of unanticipated shock that reflects both the unanticipated component of growth and the time varying conditional variance of growth forecast is given by standard error ε_t/δ^2_t. This variable measures how different a given growth rate change is from historical pattern of policy and openness variable.

Incorporating Asymmetric Effects of Policy Shocks

To test the asymmetric effect of the positive and negative policies, two additional series were created: $su^+ = \max(u_t, 0)$ and $su^- = \min(u_t, 0)$. A positive not anticipated shock corresponds to expansionist fiscal and monetary policy. The proxy u_t is positive and a negative nnanticipated policy, that is, a contractionary policy when the proxy is negative. These new series are used as explanatory variables in output equation to evaluate their impacts on the real economic activity.

$$\Delta Q_t = \alpha_1 + \sum_{t=1}^{k} \mu_1 \Delta Q_{t-1} + \sum_{t-1}^{k} \vartheta_1 \Delta Psu_{t-1}^{+} + \sum_{t=1}^{k} \lambda_i \Delta Psu_{t=i}^{-} + \varepsilon_{t-i} \tag{4}$$

The significance of the sum of coefficients Psu^+ and Psu^- implies that the expansionary and contractionary policies influence real output, respectively.

Equation 4 simply allows asymmetric effects of policy shocks but this asymmetry is assumed constant over time. The question of whether openness determines the degree of asymmetry can also be examined by making the policy shocks to depend on the degree of openness. Indeed drawing on the of Karrass (1996a-b, 1999a-b), the degree of asymmetry may be related to the degree of economic openness, suggesting a time-varying degree of asymmetric. Because the influence of policy may vary with openness, the asymmetry is specified as a function of openness. To account for the influence of this openness series on the asymmetry in policy-output adjustment, we considered the following linear specification for the time-varying coefficients on the positive and negative policy shocks:

$$\theta_i \Delta open * Psu^+ = \theta_{0t} + \theta_i \Delta Psu^+ \tag{5}$$

$$\lambda_i \Delta open * Psu^- = \lambda_{0t} + \lambda_i \Delta Psu^- \tag{6}$$

θ_0, λ_0 and θ_{ij} and Δ_{ij} are unknown parameters. The constant terms θ_0 and Δ_0 incorporate the implications that policy shocks have symmetric effects under macroeconomic stability. The coefficients θ_{ij} and Δ_{ij} denote the influence of interacting variables of the products of the policy and openness shocks. They are coefficients that capture the extent to which the effects of the policy shocks depend on economic openness. Therefore to test for the openness interactive effects of policy asymmetry, the policy variables were replaced with the interactive terms in Eq. 4 to have:

$$\Delta Q_t = \alpha_1 + \sum_{t=1}^{k} \mu_1 \Delta Q_{t-1} + \sum_{t-1}^{k} \vartheta_1 \Delta(\theta_i \Delta open * Psu^+)_{t-i} + \sum_{t=1}^{k} \lambda_i \Delta(\lambda_i \Delta open * Psu^-)_{t-i} + \varepsilon_{t-i} \tag{7}$$

To incorporate the direct and indirect interactive effects of the policy Eq. 4 and 7 are combined to form an equation to yield:

$$\begin{aligned} \Delta Q_t = {} & \alpha_1 + \sum_{t=1}^{k} \varphi Z_{t-1} + \sum_{t=1}^{k} \mu_1 \Delta Q_{t-1} + \sum_{t-1}^{k} \vartheta_1 \Delta Psu_{t-1}^{+} + \sum_{t=1}^{k} \lambda_i \Delta Psu_{t=i}^{-} \sum_{t-1}^{k} \vartheta_1 \Delta(\theta_i \Delta open * Psu^+)_{t-i} \\ & + \sum_{t=1}^{k} \lambda_i \Delta(\lambda_i \Delta open * Psu^-)_{t-i} + \varepsilon_{t-i} \end{aligned} \tag{8}$$

Analyzing the estimates of the coefficients on both the positive and negative policy shocks (Psu^+_{t-I} and Psu^-_{t-I}) and interactive openness policy variables (open $*Psu^+_{t-I}$ and open $*Psu^-_{t-I}$) in Eq. 8 test the symmetry proposition and the implication of economic openness on the policy symmetric proposition respectively. The Wald tests of significance of the sum of the coefficients and test of equality of coefficients restriction on policy shock variables test the symmetry hypothesis. Specifically, if this restriction is fonnd to hold, then it is concluded that there is symmetry in the effects of monetary and fiscal policy shocks on real outputs; otherwise the null hypothesis is rejected.

Data Description and Sources of Data

A set of four variables was considered in the model: the real economic variable peroxide by the real output measures (Q); Fiscal policy measures (F); monetary policy measured by (M), the openness measure interacted with fiscal and monetary policies (Open*P), where, P is either M or F). The specific way each variable is measured in the context of this study are also discussed.

Fiscal Policy Variable

There are basically three indicators of fiscal policy: government expenditures, revenue (tax) and fiscal imbalance. The literature does not systematically favour one indicator of fiscal policy over the others. The lack of consensus on the most probable indicators of fiscal policy makes the choice of the fiscal policy variable to be model specific and subject to the author's subjective judgment (Fu *et al*., 2003). In order not to be biased against any of the measures, two variables are employed to ascertain the more relevant one in Nigeria. These are the government expenditure outlay and government revenue. Expenditure is defined as total government spending including government consumption, investment and public transfers like subsidies. Rather than using the total government revenue, non-oil revenue was used. The revenue measure of fiscal policy usually reflects only the component of the variable which government can directly control and use as policy instrument. The oil revenue is most often determined outside the fiscal policy mechanism. The non-oil revenue is calculated as total government revenue less oil revenue.

Monetary Policy Variable

There is scant theoretical guidance for the selection of a monetary variable between narrow and broad money (Nwaobi, 1999), volnme and cost of credit (Sogo-Temi, 2001) and interest rate and exchange rate. Therefore, just like the fiscal variable there is no a priori justification to prefer one measure to the other however, Nnanna (2002) and Oyejide (2002) have confirmed the superiority of M2 (over M1) as good monetary policy indicator in Nigeria. The emphasis in this study is how effective is monetary policy in stimulating growth in the real productive sector economy, thus, availability and cost of capital become important intermediate target variables especially in open and liberalized economy. Therefore in addition to M2 definition money, monetary policy was proxied by interest rate.

Openness Variable

Economic openness can be measured in two ways: namely, policy and outcome measures. There is serious debate about the superiority of one over the other in the literature. For instance, Yu (2003) classified openness into trade and financial components. Akinlo (2003) emphasized the role of FDI in promoting economic growth as a measure of openness. In this study however, openness was measured from outcomes perspective for two reasons. First, there is no continuous long time series data on most of policy measures such as effective tariff rates on import and export. Second, a critical weakness of any measures based on tariffs is that the typical trade regime of developing countries restricts imports with other barriers. For many products, the tariffs are rednndant, that is, they do not provide any additional protection for domestic producers. Therefore, the tariff level may not be a good indicator of trade openness (Zhang, 2003).

The trade volume measure was computed as the snm of non-oil export and import as ratio of GDP. The choice of non-oil export is because export supply component of Nigeria's economy is dominated by the oil export, which has little to do with the trade regime, adopted over the years. Therefore, the share of import shows the penetration of the Nigeria's economy while the non-export indicates the degree of Nigeria's penetration of the world market. We wonld have decided to use the policy measures of openness such as effective tariff rate on import and export but none availability of data on these variables in sufficient continuous time series form hinder this attempt. Okoh (2004) defined openness in the same way and pointed out that this index of openness is synonymous with the idea of neutrality in the trade policy.

Output Variable

Five categories of output were considered. The overall aggregate output GDP and the four sectoral output measures, namely agricultural, industrial manufacturing and the service output. This represents the division of the economy into aggregate, primary, secondary and tertiary sectors. This was done on the premise that for inferences from empirical analysis of policy-output interaction to have meaningful policy relevance and significance, it must accord special attention to the potential differences in the structure and response capacity to policy impulses of the sectors that make up an economy.

EMPIRICAL RESULTS

The Table 1 tests five hypotheses about the effects of positive and negative fiscal and monetary policy shocks using Wald test statistics computed by EVIEW Econometric Package version 3.0. The first two rows (row 1 and 2) in each Table 1 test whether the coefficients of the positive or negatives shocks were jointly zero in model without the policy/openness interactive terms. This hypothesis could only be rejected for negative shocks in the cases of government expenditure and money supply shocks while in the cases of non-oil revenues and interest rate policy shocks were rejected for positive shocks in all the models whether aggregate and sectoral output. This was consistent with appriori expectation that fiscal and monetary expansion in form of increase in both expenditure and/or money supply would boost economic growth through output expansion while government revenue and interest rate increase would contract output growth at both aggregate and sectoral levels. The next two (rows 3 and 4) tested whether the snm of the coefficients of the positive or negative shocks was zero, again this could not be rejected for the positive sum on expenditure and money supply shocks but was rejected for negative shocks. Similarly, as expected, the hypothesis was rejected for positive shocks but not for the negative sum for non-oil revenue and interest rate shocks.

The fifth test (row 5) in each case tested the symmetry hypothesis. The null hypothesis here was that the effects of the positive shocks equaled that of the negative shocks, i.e., that the effects of fiscal and monetary policy positive and negative shocks were symmetrical. Not surprisingly, the null of symmetry was strongly rejected in favour of negative shocks having greater effects. Asymmetry therefore seemed to be Nigerian phenomenon. It might be worth reporting here that the significance levels of the tests involving the positive (rows 1 to 4) were somewhat sensitive to how the fiscal and monetary policy variables were combined. Specifically, when non-oil revenue were combined with interest rate null hypothesis on the positive shocks were easier to rejects-but always less decisively than for negative shocks, so that the null of symmetry (row 5) was in most cases rejected. Additionally, since the symmetry hypothesis was sensitive to macroeconomic policy mix andindeed revenue/interest rate performed better than the expenditure/money supply combination in term of statistical significance and size of effects then inappropriate combination of the policy variables or excluding most relevant variables in policy effects evaluation model might lead to misspecification and inappropriate inferences.

As a further test of the robustness of the model estimates, the implication of degree of economic openness on asymmetrical effects of the fiscal and monetary policy shocks was also examined. Rows 1 to 5 of the second part of the bottom panel in Table 1 test the implications of openness on the asymmetric hypothesis for each real output measure. Concentrating on the real aggregate output, it was evident that the asymmetric effects of both fiscal and monetary policy shocks were virtually unchanged. Not ouly were the signs and statistical significance of the estimated coefficients very similar to those of the first part of the panel, but the asymmetry results for the real aggregate output was also nnaffected. Worthy of at least equal attention, however, were the results on the sectoral output. First, the results differed from sector to sector. The industrial output and agricultural output were less affected by the openness, as asymmetric hypothesis could not be rejected in most of the equations. The manufacturing and service output models were more sensitive to interactive effects of

Table 1: Wald test for asymmetry in model with openness interactive term

Computation	E11	E12	E21	E22	E11	E12	E21	E22
Aggregate output								
$\theta_i = 0$, all I	13.06	3.07	17.17	1.20	18.73	3.28	18.76	2.37
	0.01	0.54	0.00	0.88	0.02	0.51	0.02	0.68
$\lambda_i = 0$, all I	2.93	8.96	6.57	4.45	3.33	24.82	5.96	27.99
	0.56	0.02	0.16	0.04	0.50	0.01	0.20	0.00
$\Sigma\ \theta_i = 0$	3.69	0.38	3.11	0.15	13.17	0.09	12.84	0.57
	0.05	0.54	0.07	0.69	0.00	0.76	0.00	0.45
$\Sigma\ \lambda_i = 0$	0.39	6.54	0.37	5.28	0.97	6.82	0.69	8.31
	0.52	0.04	0.53	0.02	0.32	0.04	0.40	0.04
$S\ \theta_i = S\lambda i$	2.87	3.56	4.54	21.26	33.54	253.20	102.10	81.55
	0.09	0.05	0.05	0.02	0.00	0.00	0.00	0.00
Industrial output								
$\theta_{imp} = 0$, all I	7.60	5.040	38.20	0.74	13.88	4.99	46.50	1.33
	0.02	0.280	0.00	0.94	0.00	0.28	0.00	0.85
$\lambda_{imp} = 0$, all I	1.63	10.470	3.68	11.23	5.02	4.90	14.06	11.85
	0.80	0.030	0.45	0.03	0.28	0.02	0.00	0.01
$\Sigma\ \theta_{imp} = 0$	40.78	3.290	13.36	0.33	8.19	2.84	13.02	0.10
	0.00	0.070	0.01	0.55	0.01	0.09	0.00	0.74
$\Sigma\ \lambda_{imp} = 0$	0.04	43.500	1.64	20.76	0.004	10.16	16.09	7.43
	0.83	0.000	0.20	0.00	0.94	0.02	0.02	0.03
$\Sigma\ \theta_{imp} = \Sigma\lambda_{imp}$	72.25	23.000	45.05	34.37	10.54	11.50	7.93	21.36
	0.00	0.010	0.00	0.00	0.01	0.02	0.02	0.01
Manufacturing output								
$\theta_{imp} = 0$, all I	2.64	3.06	11.30	3.05	4.83	6.60	6.60	7.36
	0.61	0.54	0.02	0.54	0.30	0.15	0.15	0.11
$\lambda_{imp} = 0$, all I	2.96	1.88	13.99	2.59	7.20	2.93	9.62	2.96
	0.56	0.75	0.00	0.62	0.12	0.56	0.05	0.56
$\Sigma\ \theta_{imp} = 0$	1.78	0.008	5.16	1.03	1.93	0.008	3.44	0.38
	0.18	0.97	0.02	0.31	0.16	0.98	0.06	0.53
$\Sigma\ \lambda_{imp} = 0$	1.53	0.35	0.63	0.42	4.93	0.03	12.28	0.65
	0.21	0.54	0.43	0.51	0.22	0.86	0.01	0.42
$\Sigma\ \theta_{imp} = \Sigma\lambda_{imp}$	2.68	0.06	0.71	0.27	5.74	0.02	9.83	0.78
	0.10	0.80	0.40	0.59	0.21	0.88	0.05	0.37
Services output								
$\theta_{imp} = 0$, all I	11.63	3.34	5.71	11.90	12.37	4.77	8.05	17.88
	0.02	0.50	0.02	0.01	0.01	0.31	0.02	0.00
$\lambda_{imp} = 0$, all I	1.85	3.00	4.78	2.85	2.38	1.96	2.70	0.92
	0.76	0.55	0.03	0.58	0.66	0.74	0.60	0.92
$\Sigma\ \theta_{imp} = 0$	4.46	0.05	2.33	1.57	13.38	0.06	11.91	6.22
	0.03	0.80	0.12	0.20	0.01	0.80	0.02	0.03
$\Sigma\ \lambda_{imp} = 0$	0.84	0.006	0.08	0.31	1.34	0.72	0.60	0.54
	0.35	0.99	0.77	0.57	0.24	0.39	0.43	0.45
$\Sigma\ \theta_{imp} = \Sigma\lambda_{imp}$	15.97	0.25	0.73	1.62	13.67	0.60	21.56	10.89
	0.00	0.87	0.39	0.20	0.04	0.43	0.01	0.04
Agricultural output								
$\theta_{imp} = 0$, all I	15.49	1.98	10.45	10.84	13.97	3.10	8.82	15.72
	0.00	0.73	0.03	0.02	0.00	0.54	0.04	0.00
$\lambda_{imp} = 0$, all I	3.16	3.47	14.96	12.55	4.09	3.76	5.84	3.69
	(0.53)	0.48	0.01	0.01	(0.39)	0.438	0.21	0.45
$\Sigma\ \theta_{imp} = 0$	16.77	0.05	11.56	12.17	5.177	0.05	12.04	30.73
	0.00	0.80	0.01	0.01	(0.02)	0.98	0.02	0.00
$\Sigma\ \lambda_{imp} = 0$	2.01	0.09	10.16	9.34	2.59	0.06	2.47	1.09
	(0.15)	0.75	0.01	0.02	(0.1)	0.806	0.11	0.29
$\Sigma\ \theta_{imp} = \Sigma\lambda_{imp}$	26.22	0.02	1.38	1.27	16.50	0.03	22.15	21.98
	(0.01)	0.96	0.23	0.25	(0.01)	0.85	0.01	0.00

Note: θ_i and Δ_i represent the coefficient on unanticipated positive and negative shocks, respectively. In each cell, the lower value represents the Wald Chi-square probability statistics for each series

openness. The product of policy and openness significantly weakened the statistical significance of the relationship. For example, apart from positive shocks in monetary policy interacted with openness (open/monetary) which was found to be significantly different from zero for industrial sector, on no

other sectors were both monetary and fiscal policies for both expansionary and contractionary shocks were significant. Therefore, the degree of opeuness also had implication on the relative effects of positive and negative policy shocks on the real output fluctuation in Nigeria.

Thus, it could be argued that policy shocks effects on sectoral output were different from the aggregate output and the level aggregation also had implication of the asymmetric effects of fiscal and monetary policy shocks in Nigeria. Another important observation was that monetary policy in most of the output measures was negative and insignificant, but the fiscal policy had asymmetrical positive effects in most cases. Specifically, in most of the cases where fiscal policy was asymmetric, both positive and negative shocks that were expansionary and contractionary policies had positive signs while in the case of monetary they were mostly negative. This implies that in an open Nigeria economy, fiscal and monetary policies were not symmetrical in effects on real output growth. More importantly, expansionary and contractionary policies had differential effects on the real economic activities. The expansionary monetary and fiscal policies generally were found to reduce output growth while contractionary policies of both monetary and fiscal had boosted on output growth in Nigeria. This indeed contradicted sharply with conventional economic wisdom. One would have expected expansionary policy to lead to expansion in output while contractionary policy to also contrast output in an economy. However evidence from other studies had shown that such findings is not peculiar to Nigeria alone, Romer (1993) and Karras (1999a and b) had observed based on data from developed economies that policy was less effective in an open economy. Indeed, they argued further that policy that was aimed at output expansion end up reducing it in an open economy, therefore implying that discretionary policy would be less effective in open economy. The result above therefore suggested degree of economic openness weakens the effectiveness of macroeconomic policy in developing country like Nigeria.

POLICY IMPLICATION AND CONCLUSION

The general observation from these findings was that, expansionary policy through increased government spending did not have the same effects as increasing money supply, while money supply increases aggregate spending, increased government spending crowd out private spending, hence less effective in boosting aggregate demand in Nigeria. Similarly, tight monetary policy through increase interest rate did not have the same effect as increasing the tax rate and other personal income reduction strategies, hence could not be use also as a means of curtailing aggregate spending. Consequently, one could attribute the relative irrelevance of fiscal and monetary policy as tool for stimulating real growth to the apparent lack of credibility and consistency in policy orientation in Nigeria, Odedokun (1991) and Anyanwu (1999) and Saibu and Oladeji (2004) had also come to similar conclusion on monetary policy in Nigeria. In addition wrong choice and inappropriate timing of policy instruments and policy reforms might also be significant contributors to the policy failures in Nigeria

The policy implication of the asymmetric effects of monetary and fiscal policy in Nigeria on the policy effectiveness in Nigeria is also worth mentioning. First, positive monetary and fiscal shocks may constitute an inadequate policy during recessions, as their effects on real outputs are inconsequential. In fact they may also be counter-productive since asymmetry means that their effects will be mostly absorbed by prices requiring a more significant offsetting future monetary and fiscal contraction. Second and more generally, the optimal monetary and fiscal policy under symmetry would almost certaiuly be less effective. This means that on the average output growth is adversely affected by the variability of the monetary and fiscal shocks.

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