AN ECONOMETRIC ANALYSIS OF THE RELATIVE POTENCY OF MONETARY AND FISCAL POLICY IN NIGERIA

By

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This study investigates econometrically, the relative potency of monetary and fiscal policies, by focusing on the relative effectiveness of money supply and government expenditure with respect to their influences on economic activities represented by the gross domestic product (GDP). The conclusions could be of immense value for suggesting which option is more ideal for application in economic stabilization programme of the Nigeria economy at any given time.

In order to achieve the objective, we propose and specify models with parameters, which are estimated and used to test the hypothesis on the relative potency of monetary vis-a-vis fiscal policy, namely, that in the short-run there is relatively greater effectiveness of monetary policy than that of fiscal actions on economic activities i.e. that monetary actions impact more significantly and stably on economic activity than fiscal operations; the econometric method is applied to establish the extent of the quantitative impact and relative significance of such actions. The results of the original article of St. Louis equation applied to US data led to the inference that monetary actions have a significant and permanent effect on nominal GDP growth, while fiscal actions exert no statistically significant lasting influence. The above results have also been reconfirmed by Ajayi's test of this hypothesis using Nigerian data from 1960-1970 and the cross country study using several African countries' data, including Nigeria by Ubogu.

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We adopt the modified version of the St. Louis equation as in Batten and Hafer (1983), and provide estimates, based on first differences and percentage changes of the data. The results also include the respective t-ratios, beta and elasticity coefficients to facilitate direct comparisons. In instances where annual data *were used for estimation, the coefficients of money supply and exports were statistically very significant while those of government expenditure were not significant. This agrees with the hypothesis that monetary actions are more potent than fiscal policy, in the shortrun. On the other hand, when quarterly data are applied, changes in government expenditure tended to influence gross domestic income very significantly, whether first differences or per centage changes were used in the estimation. Finally, in both cases, the coefficient for EXPT is not significant. This confirms earlier results by Ubogu (1985) such* that the *exclusion of export variable in the earlier studies on Nigeria appear not to weaken the conclusions of relatively greater and more stable potency of monetary actions compared with fiscal operations, rather sharp fluctuations of such fiscal actions indicate that they are more distortionary than achieving the desired impact or direction on the target variables.*

I. INTRODUCTION

Economic policy is dominated by monetary and fiscal policies. Other policies include incomes, prices, employment, trade and industrial. Money supply and government expenditure are two cardinal tools of monetary and fiscal policies, respectively.

Monetary policy is construed to be actions by the monetary authorities to influence the national economic objectives by controlling or influencing the quantity and direction of money supply, credit and the cost of credit. It is aimed at ensuring adequate supply of money to support financial accommodation for growth and development programmes, on the one hand and, stabilising various sectors of the economy for sustainable growth and development, on the other hand. Monetary policy is, therefore, defined by Johnson (1962) as policy employing the Central Bank's control of the money supply as an instrument for achieving the objectives of economic

policy. Similarly, from a synthesis of most of the literature and in the context of the Nigerian situation, Ubogu (1985) defines monetary policy as an attempt by the monetary authorities to influence the level of aggregate economic activities by controlling the quantity and direction of money and credit availability.

Fiscal policy is defined as the use of government expenditure, taxes, borrowing and financial administration to further national economic objectives. Government uses its expenditure and revenue activities to effect desired changes in income, production, prices and employment. These changes concern national economic objectives, which are targets of monetary and fiscal policy and include acceleration of economic growth and development, balance of payments equilibrium, price stability and reduction of rate of unemployment. These goals are pursued through the application of monetary and/or fiscal policy using as many of their respective tools as may be deemed efficacious and appropriate.

There is consensus that monetary and fiscal policy, jointly and individually affect the level of economic activities on which policies focus. The degree and relative superiority of one instrument over the other in achieving these objectives has been the subject of debates and controversies among policy makers and economists, and tentative resolutions are attempted empirically for different countries and different periods and circumstances.

In ensuring optimal expansion in liquidity for meeting desired growth and balance of payments objectives, and at the same time achieve economic stability, monetary policy is complemented with **disciplined** and **coordinated** fiscal policy. In a typical developing country like Nigeria, where the financial and capital markets are underdeveloped, monetary policy is adapted to accommodate governments' financial needs for tackling critical and urgent problems of economic growth and development. The three key elements of monetary policy are reserve money, credit supply and interest rate, which jointly determine the liquidity in the economy. This is directly or indirectly related to economic activity, such that the optimal injection of liquidity would induce a non-inflationary expansion of the economy, ensuring both internal and external balance. Consequently, monetary policy requires establishment

of a relationship between monetary instruments, which the authorities control, and the key targets of policy or economic objectives enumerated earlier. However, it is theoretically and practically more convenient to work out the relationship between the instruments or operating targets such as open market operations, interest rates and intermediate targets such as money supply and aggregate credit to the economy. There are many tools of monetary policy including bank credit, interest and discount rates, reserve requirements, credit ceilings, moral suasion and open market operations. The application of these tools are directed at influencing the size and behaviour of money supply which in turn affects output, income and prices as well the balance of payments. Money supply is therefore, the centre-piece of monetary tools and intermediate target of monetary policy. In theoretical economic parlance, it is denoted as money supply, Ml or M2, narrowly or broadly defined, respectively.

Similarly, government expenditure can be financed from direct and indirect taxes, monetization of foreign exchange earnings, domestic credit from the banking system including ways and means advances by the central bank, and borrowing from the non-bank public. On the uses side, disbursement of these funds could be in form of current or capital expenditure, which are broken down further into smaller subheads.

This study investigates econometrically, the relative potency of monetary and fiscal policies, by focusing on the relative effectiveness of money supply and government expenditure with respect to their influences on economic activities represented by aggregate output represented by the gross domestic product (GDP). The conclusions could be of immense value for suggesting which option is more ideal for application in economic stabilization programme of the Nigeria economy at any given time.

In order to achieve the objective, we propose and specify models with parameters, which are estimated and used to test the hypothesis on the relative potency of monetary vis-a-vis fiscal policy, namely, that in the short-run there is relatively greater effectiveness of monetary policy than that of fiscal actions on economic activities i.e. that monetary actions impact more significantly and stably on economic activity than fiscal operations;

that expansionary monetary policy, arising from unrestrained and uncoordinated fiscal operations in any open economy like Nigeria leads to a deterioration of the balance of payments and the depreciation of the exchange rates, i.e. using GDP as the surrogate for economic activity, while money supply, government expenditure and exports, represent monetary, fiscal actions and balance of payment situation, respectively. Therefore, for ease of exposition, this paper including the introduction is divided into five sections. Section 2 deals with the theoretical analysis, literature review and evidence. Model specification and estimation is given in section 3, while the results are presented in section 4. The paper is concluded in section 5, with the summary, conclusions and recommendations.

II.   THEORETICAL ANALYSIS, LITERATURE REVIEW AND EVIDENCE

The essence of the review of the literature on existing econometric models on the issues concerning the relative effectiveness of monetary and fiscal policy, including such models on the Nigerian economy, is to adapt the salient features already established as well as identify and address any critical issues that have not been adequately or properly resolved so far. Consider the limited sources of government finances, especially in view of the crucial role money has been recognised to play in the growth and development process of developing economies like Nigeria.   The acceleration of the pace of economic development normally leads to urgent and huge financial requirement of funds over and above revenue (budget deficit) which is financed by borrowing from the financial system (bank and non-bank) , the private sector and from abroad. Since the financial market is relatively underdeveloped, much of the borrowing is made from either the banks (Central, Commercial and lately merchant) and from abroad. For all these cases, money supply would be affected by the implementation of budgetary decisions, hence monetary and fiscal policies would be confounded and monetary-fiscal-policy-mix would be prevalent. However, the relative importance of either instrument in the context of the above hypotheses cannot be over-emphasised.

Government aspiration towards the achievement of broad economic objectives enumerated earlier could be pursued by means of monetary, fiscal or monetary-fiscal-policy-mix strategies. However, the relative effectiveness of monetary and fiscal policy and the lag with which they affect economic activities, has been controversial issue among economists and the debate forms one of the major areas in which monetarists and Keynesians continue the research in monetary economics.

Theoretical macrostatic analysis of monetary and fiscal policy is done within the Hicksian IS-LM framework, where money supply and government expenditure are crucial variables, and IS and LM represent fiscal and monetary policy equilibrium situations, respectively[2].

II.1 Monetary Policy And Economic Activity

Consider an expansionary monetary policy through open market operation which begins with central bank buying a quantity of treasury securities from the commercial banks and other authorized dealers. The banks consequently acquire excess reserves and expand their lending and so the money supply expands. To a monetarist, the lending activity itself generates spending; the upward pressure on security prices provides capital gains to be spent or invested. Either way, as money supply increases income and output also increase in the final analysis. To a Keynesian, whatever effects we get from the increase in money supply depends on how responsive consumption and investment are, in real terms, to changes in interest rates. If investment is interest-elastic or responds quickly, then the effects will tend to be large via the investment multiplier[3]. The implication of this is that the elasticity of the money supply in the money and the investment schedules is crucial in assessing the role of money supply.

Changing money supply by means of monetary policy actions originates from the monetary sector of the economy, while the variables that monetary authorities or central bank want to influence are in the real (or output) sector of the economy. The transmission mechanism through which these actions in the monetary sector are transmitted to the real sector, is one area in which keynesians and monetarists differ.   But in empirical

analysis, given a particular area of the IS-LM schedule or curves, we would expect consistently the same results. The verification of the relative potency of money supply and government expenditure in this study would not be drawn into the debate but rather concentrate on already accepted methodologies in empirically testing the pertinent hypotheses. But for completeness of the discussion, we devote this part of the section to elaborate the conclusions of the two schools on the transmission mechanism[4].

It is posited that the discrepancy between money supply and money demand comes about in two ways, namely, direct printing add issue of money by central bank or through the use of any of the monetary control techniques. The direct printing of money increases money supply, while the use of tools of monetary control affects the volume of bank reserves setting in motion the machinery of portfolio adjustment on the part of the banks. This concerns particularly their credit-creating ability which leads to change in money supply through the multiple expansion of deposits generated by credit creation. An expansionary monetary policy leading to increase in money supply leads to portfolio and credit effects.

The portfolio effect comes about through substitution of other financial assets for money to rid excess money balance. Attempt to buy other financial assets pushes up their price, depressing their yield (or rate of interest). The credit effect occurs through attempt by commercial banks to readjust their lending policy in the light of changes in reserves. Increased reserves tend to create more credit and depresses the rate of interest further. Thus both the portfolio and credit effects work to depress (or decrease) the rate of interest. The decrease in interest rate results in three distinct effects namely: the wealth effect, cost of capital effect and credit-rationing effect.

Wealth effect comes about through the fall in interest rate which increases the market value of individual wealth and tends to stimulate consumption and through multiplier stimulates investment and aggregate output. In this cost of capital effect, it is postulated that the main determining factor of investment is the cost of borrowing (i.e. cost of capital). Thus the fall in interest rate makes the cost of borrowing cheaper (given the inverse relationship between them) and thus investment is stimulated. Increased

investment working through the multiplier in increases aggregate output. Cost of capital effect is the kingpin of the keynesian transmission mechanism.

Credit rationing effect is based on the existence of imperfect capital market which will make the cost of capital impotent. This emanates from the fact that loan agreements involve many factors other than the price or cost of the loan. Cost of capital may also be rendered ineffective as a result of the possibility of using internally generated funds by firms to finance investment. These two features could lead to credit-rationing-situation where the rate of interest does not clear the financial market and lenders have to resort to non-price measures to allocate credit[5].

The Monetarist transmission mechanism on the other hand is based on the hypothesis that money is not just a close substitute for a small class of financial assets but rather a substitute for a large spectrum of financial and real (or physical) assets. Thus if the central bank through its open-market operations (purchases of government securities) increases money supply, sellers will want to rid themselves of excess money balances since their desired and actual holding of money balances are no longer equal. The monetarist also contend that if sellers were individuals who deposit proceeds in bank accounts, bank reserves will increase and hence banks' ability to create credit. On the other hand, if sellers were commercial banks themselves, reserves will increase thus their loan and credit creating capacity. Thus, in each case there is readjustment of portfolios, each will want to buy assets that are similar to the ones sold. In the process, the prices of these securities will be pushed up relative to the prices of real (or physical) assets. This will lead to further desire on the part of wealth-holders to try to adjust their portfolios once more by acquiring real assets. This makes existing real assets to be more expensive relative to new ones. The rise in price level of real assets increases wealth relative to the purchase of sources of services. This raises the demand for productive services both for producing new capital goods and for purchasing current services. Thus the monetary impulse is, in this way, spread from the financial markets to the market for goods and services, thereby increasing aggregate output and spending.

Reconciling both schools of thought, we could note the following: firstly the schools agree that money affects the level of economy activity. They only differ in the degree of impact and in the channel through which monetary impulses are transmitted from the monetary to the real sector. Secondly, keynesian school postulates a close substitution between money and financial assets. While the monetarist contend that substitution exists between money, financial assets and real assets. Monetary policy is usually conducted within the framework of a financial structure. In most developing countries, rudimentary financial structures do exist and there is complete absence of financial assets that are close substitute for money. In such a situation, the effects of monetary policy instead of being transmitted through the financial markets before being transmitted to the real sector, are likely to be transmitted (rather quickly) into the market for real assets, thereby producing an immediate impact on the level of economic activity.

II.2   The Role of Government Expenditure In Fiscal Policy

An expansionary fiscal policy is characterized by an increase in real government expenditure, which could be financed by issuing bonds, printing money and/or by increasing taxes. Pure fiscal policy in the conventional macroeconomic model assumes that government finances its expenditure through borrowing from the public after exhausting the revenue. However, the mode of deficit financing has important implication on the overall effectiveness of fiscal or monetary policy.

It is posited that the main cause of excess liquidity in the monetary system, and hence its adverse effects is budget deficits of Government both at the Federal and State levels[6]. Various economic measures taken by the governments have their side effects as the introduction of measures to deal with one problem tended to create other problems. One of the ways of assessing the roles of government expenditure in fiscal policy is to visualize and appreciate it in the context of the existence of a large public sector. Nigeria's public sector has grown very large over the years especially since independence in 1960. This sharp growth can be roughly inferred from the contribution of government services to GDP, from about 2.3 per cent in the early 1960s to over 20 per cent in the 70s and more than 30 per cent in the 80s and 90s.

The increasing size of government services was due to interventionist role of the government in economic and social life of the country, coupled with availability of public sector resources from oil exports during periods of balance of payment surpluses and from loans and advances during lean periods. ˙ The trend, size or magnitude of government expenditures used to effect these interventions could be compared with their achieved contributions to the changes in real GDP and the impact on prices, balance of payments and economic stability. When this is done, it is observed that government intervention through huge expenditure (a lot of which is deficit expenditure on non-productive activities) rather than solve, ended up compounding issues and tended to render ineffective monetary and other economic policies. The poor performance of the public sector resulting from these expenditures has been attributed to a number of factors including mismanagement, indiscipline, corruption and misplaced priorities, lack of coordination of policies and short-sightedness. The extent of these effects of government expenditure on output and prices would be the focus of this econometric analysis.

Government expenditure, as we earlier noted, can be financed either through tax revenue including foreign exchange earnings from tariffs, import duties, royalties, company taxes etc, or through credit from the banking system including ways and means advances from central bank or public debt (domestic and external loans) . Each mode of financing government expenditure may have different consequences depending on how it affects the real (output) sector, the money supply and balance of payments.   The point to note is that government expenditure, however defined plays a cardinal role in fiscal policy. Besides, money supply changes may result from fiscal actions depending on the method that government uses to finance its spending.

From the above analysis, it had been noted that there is some consensus that money supply and government expenditure, the two key instruments of monetary and fiscal policy, significantly effect economic activities. However, there is a considerable amount of disagreement about the relative potency of these actions. We also noted that basic macrostatic and dynamic analysis of the relative effectiveness of these instruments, based on the Hicksian

IS-LM framework reveal that change in government expenditure, representing fiscal policy, is completely effective in the keynesian or liquidity trap region, where the demand for money is perfectly interest elastic, somewhat effective in the neo-keynesian region (i.e. positive sloping LM curve) where the demand for money exhibits an interest elasticity (which is positive and finite) and completely ineffective in the classical region in which the LM curve is vertical and the demand for money is perfectly interest inelastic.

The effectiveness of money supply is the reverse of that of Government expenditure in the liquidity trap and classical regions. Consequently, policy action with money supply is completely ineffective in the liquidity trap region but fully effective in the classical or vertical LM region, and some how effective in the intermediate neokeynesian region. This region, which is the situation of most economies, calls for monetary fiscal-policy-mix.

The econometric analysis of the relative effectiveness of changes in money supply and government expenditure in abstracting from static and dynamic policy multipliers, which also involve the elasticities.

We expect empirical results to lead to conclusions about the relative efficiency of monetary and fiscal policy. The specification and testing of the hypothesis can be viewed as an empirical matter involving money supply and government expenditure. Furthermore, the analyses assumes that, given the values of the interest responsiveness for elasticity of the demand for money and interest responsiveness of investment demand, the relative efficiency of money supply and government expenditure, and indeed, any other roles of monetary and fiscal policy is determined by the price level. The implication of this is that where there is persistent inflationary tendency, it is more efficacious to rely on fiscal policy or government expenditure to curb such inflationary pressures. On the other hand, when the price level is falling, the economy should be stimulated by appropriate mix of fiscal and monetary policy.

As part of the monetarists' counter-revolution against keynesianism following the emergence of stagflation (twin occurrence of high unemployment and high inflation) Friedman and Mieselman (1963) empirically investigated

the responsiveness of general level of economic activity, represented by aggregate consumption, to change in money supply and autonomous government expenditure. Applying U.S.A. data for a period of 60 years (1897- 1957) to two regression equations, they concluded from the results that a stable and predictable relationship existed between money supply and aggregate demand while no such significant relationship was observed for government expenditure.   Although, the Friedman and Mieselman study was the first statistical model that was constructed and used to test the relative potency of money supply and government expenditure the result of the investigation in this direction by Anderson and Jordan (1968) sparked off other studies using both monetarist and fiscalist theories in developed economies.   These studies form the bulk of those generalised studies to test the relative potency of monetary and fiscal policy with the most prevalent representative tools being money supply (M1) and government expenditure.

The Anderson and Jordan study tested three propositions that the response of economic activity to fiscal actions, relative to monetary actions (represented by GDP, government expenditure and money supply M1, respectively as surrogates) is (a) larger (b) more predictable, and (c) faster. The results of the tests were not consistent with any of these propositions. Consequently, either the commonly used measures of fiscal influence do not correctly indicate the degree and direction of such influence, or there was no measurable net fiscal influence on total spending in the test period.

On the other hand, the tests are consistent with an alternative set of propositions.   The response of GNP to changes in money supply compared with that of government expenditure is larger, more predictable and faster.   Therefore, for purposes of economic stabilization, it claims that monetary actions are relevant than fiscal actions.

Keran (1970), is a cross-sectional time series study based on data from seven developed countries outside U.S.A.   In all the eight countries, Keran finds that money supply exert more influence on GNP than changes in government expenditure.   Also along the same line as the Anderson and Jordan study, Teigen (1975) applies the methodology to data from three

Scandinavian countries, namely, Denmark, Finland and Norway to determine the relative potency of money supply and government expenditure. In all the three countries studies, it is observed that government expenditure dominates economic activity, even after transforming the results to Beta and elasticity coefficients. The results contradicted the earlier conclusions by Anderson and Jordan collaborated by that of Keran.

In Lybeck and Teigen (1975), using Swedish data, and the Anderson and Jordan methodology, quarterly changes in nominal GDP are regressed on quarterly changes in money supply and government expenditure. Unlike the earlier results from the data on Denmark, Finland and Norway by Teigen, the findings with Swedish data showed inconclusive evidence as to which of the two policy instruments had stronger influence on GDP. They hinged the conflicting and inconsistent results on specification problems bothering on omitted exogenous variables and on autocorrelation.

The results in Batten and Hafer (1983) seem to have reconciled the conflicts in the earlier studies. Batten and Hafer derive the condition that for the Anderson and Jordan equation to be conceptually and correctly specified , the "missing" exogenous variables should neither be policy variables nor closely correlated with money supply and government expenditure or any other variables used to represent monetary and fiscal actions. Omission of such variables in the circumstance would not pose a serious statistical problem.

In practical terms, the Anderson and Jordan model might be adequate for a closed economy, but not so for an open or semi-open economies, in which exports account for a large proportion of the GNP. And since monetary and fiscal policy affect the foreign sector, the correlation between, external and domestic influences on GNP rises as the economy becomes more open. Consequently, the Anderson and Jordan model is extended by including exports in the analysis of the relative impacts of monetary and fiscal policy, and the changes in GNP are regressed on current and lagged changes in money supply, government expenditure and exports.

Using this modification and quarterly data, Batten and Hafer estimate the effects for Canada, France, Germany, Japan and U.S.A. The sample periods

differ due to differences in data availability. The results give a wide range of explanatory power in the explanation of GNP growth, using R^2, the adjusted coefficient of determination, which varied from. a high of 82 per cent in France to a low of 20 per cent in Japan. Based on these results, Batten and Hafer conclude that money growth is more important than government expenditure, or any other tool of fiscal policy, in determining GNP growth in all six countries. The results are seen to· be robust across the "fixed" and "flexible" exchange rate regimes and closed and open economies.

Specific literature addressed to investigate the relative potency of monetary and fiscal policy in developing countries is relatively scanty, Nigeria being no exception. In Nigeria, Ajayi (1974) set out to investigate this by testing the usual hypothesis for Nigeria, namely that fiscal policy exerts a larger influence on economic activity than monetary policy; that the response of economic activity to fiscal is more predictable than to monetary policy. First differences rather than percentage changes (or growth rates) of these variables between 1960 and 1970 in Nigeria are applied to the Anderson and Jordan regression model to obtain the estimates. Independent variables, included in various combinations, are government expenditure, government revenue, deficit expenditure, money supply (broadly and narrowly defined) and a variable summarizing'all other forces that influence total spending, represented by GDP. The last all-embracing exogenous variable could not be estimated directly, hence the constant term is expected to capture it. The expected signs and magnitudes as stated in the Anderson and Jordan specification are applicable in the specifications, and beta coefficients are calculated.   In estimating the model, Ajayi regresses nominal changes in GDP on changes in five different measures of monetary influences and three different measures of fiscal variables. For monetary actions, money supply narrowly defined (M1) (i.e. currency outside banks plus private sector demand deposits) and money supply broadly defined M2 i.e. M1 plus time and savings deposits of commercial and merchant banks; and a third definition of money supply (M3), which is the sum of currency outside banks plus the total of commercial bank deposits are

among monetary instruments alongside two others: High-powered money (H) consisting of currency and reserves, and broadly defined high-powered money (H*) which is high-powered money (H) plus Treasury Bills outside the Central Bank.

On the other hand, the fiscal policy tools applied are federal government deficits/surplus, federal government revenue and federal government total expenditure. From all these tools, a selection analysis is applied to obtain the compression of the variables into three, namely changes in government expenditure, revenue and money supply.

In the regression estimates, the constant term was expected to capture the effect of other omitted exogenous variables. From the result, Ajayi concludes that monetary variables performed better than fiscal variables in influencing economic activity of Nigeria.

A cross-country study, applying the Anderson and Jordan investigation conducted with data from 15 African countries including Nigeria by Ubogu (1985). The other countries are Benin Republic, Central African Republic, Chad, Ghana, South Africa, Gabon, Cameroun, Egypt, Senegal, Somali, Sudan, Tunisia and Zaire. Three variables are involved. GDP was regressed on differences of money supply (M1) and total government expenditure (G). Time series data spanning 17 years are obtained for the analysis for each of these countries, and from them, first and second differences are calculated and applied to obtain regression estimates. Like in the earlier studies, BETA coefficients of the monetary and fiscal instruments are computed for direct comparison of the impact coefficients. Diagnostic tests performed included those of autocorrelation using the D-W statistic and Chow-test. The results indicate non-existence of serial correlation in the data. More over, Chow-test confirms the structural stability of the model.

The conclusion of the study is consistent with that of both Anderson and Jordan and Ajayi. Although both policy actions exerted remarkable impact on GDP of most countries, money supply dominates government expenditure in the effects on GDP. On the basis of the findings, Ubogu recommends the need for policy makers to identify the more potent policy

tool for purposes of selecting the correct stabilization instruments.

In order to derive results that could be comparable to earlier studies, Ubogu (1985) adopts the same single equation reduced form model approach for simplicity, though he admits the superiority of the simultaneous equation model approach. This is because the simultaneous system allows one to distinguish between the indirect effects of the two policy options, and makes it possible for the researcher to see how sub-sectors of the economy are affected. For the same reason of comparison, we carry out similar tests on Nigerian data with a refined Anderson and Jordan approach modified along the lines of Batten and Hafer (1983).

III.   MODEL SPECIFICATION AND ESTIMATION

The results of the original article of St. Louis equation applied to US data led to the inference that monetary actions have a significant and permanent effect on nominal GDP growth, while fiscal actions exert no statistically significant lasting influence. The above results have also been reconfirmed firstly by Ajayi's test of this hypothesis using Nigerian data from 1960-1970 and secondly the cross country study using several African countries, data, including Nigeria by Ubogu for a period of 17 years. However, the specification of these models are criticised for treating some endogenous variables as if they were exogenous, and ignoring the likely interrelation of domestic and external influences on GDP in an open economy. In the present study, to test this hypothesis, therefore, we adopt the modified version of the St. Louis equation as in Batten and Hafer (1983):

$$\ddot{GDPT} = \mu_0 + \sum_{i=1}^{5} \mu_i \ddot{M2}_{t-i} + \sum_{j=0}^{5} \beta_j \ddot{GEXP}_{t-j} + \sum_{i=0}^{5} \gamma_i \ddot{EXPT}_{t-i} + + V_3 t \ldots\ldots\ldots (4.4.8)$$

where the dots (. .) above the variables indicate that the equation is estimated in growth or change form (i.e. first differences). The symbols (GDPT) and (M2) are as earlier defined; (GEXP) and (EXPT) are total government expenditure and total exports, respectively.

It is desirable to examine the stability of the estimated income relationships by means of either Chow and/or Gujarati tests using the binary (0, 1) or dummy variables. An alternative way is to estimate for the entire period 1960 to 1995 as well as for sub-periods, and then compare results of the coefficients.

Initial estimates have been based on annual data, 1960-1995; however, as the objective calls for short-term analysis, quarterly time series data for these variables are also applied for money supply and Government Expenditure (1960-1988); while interpolated data were computed and applied for GDP (1960-1995) and Government Expenditure.[7] The Time Series Processor (TSP) and (EVIEWS) computer software packages were applied to the econometric analysis.

IV.   EMPIRICAL RESULTS:

As a preamble to results of the model on the relative effectiveness of monetary and fiscal policy, a summary of the descriptive analysis is considered worthwhile. The four surrogate variables used as measures of economic activity, monetary policy, fiscal policy and external sector developments are real gross domestic product (GDP), money supply (Ml or M2), government expenditure and exports, respectively. Their annual average rates of change have been calculated and graphed as shown in charts 4.1 and 4.2, whereas chart 4.1. shows all three key variables: changes in Gross Domestic Product (GDP),. government expenditure (GE) and broad money supply (M2) in the presence of total exports (EX). As contemporary Nigerian literatures summarised the period into seven phases, these changes have been summarised accordingly as presented in Table 4.1. With reference to Table 4.1 and Charts 4.1 and 4.2, it is   observed that during periods of moderate monetary and fiscal expansion, as well as monetary and fiscal restraint, the changes in the three variables tend to move very closely together. This was particularly true between 1965 and 1966 when the annual average rates of GDP, money supply and government expenditure were 7.5, 6.5. and 4.5 per cent, respectively. During period of moderate monetary expansion, money supply changes (M1) led to changes

in GDP. On the other hand, when money supply contraction was accompanied with sharp increases in government expenditure, GDP changes appeared to be moving in sympathy with changes in money supply and export. However, in such cases, some fluctuation in government expenditure tended to cause distortions in money supply. Again looking at the graphs, changes in export earning tended to be propelling government expenditure. This was particularly the case between 1973 to 1977 when the annual changes averaged 35.0, 48.2, 57.0 and 49.6 per cent for GDP, money supply, government expenditure and exports, respectively, as shown in Table 4.1.

In particular, comparing the representations in Charts 4.1 and 4.2, it can be noticed that (GDP) and (M2) move more closely together and systematically than (GE). We decided to include inflation rates as source of extra information, since it is not included in the specification of relative potency model. It is noticed that inflation also moves in sympathy with both money supply and (GDP) changes. Although, the tables and graphs give us a vivid idea of the relative potency of money supply and government expenditure on economic activity as represented by (GDP), the real quantitative impact is better revealed by the results of the analysis of the econometric model.

The estimates of the model on the relative potency of monetary and fiscal policy are presented in Table 4.2. The estimates are based on first differences and percentage changes of the annual data in two periods, 1960 - 1993 { (a) and (b) } and quarterly data, 1960:1-1993:4 (c), respectively. Results are accompanied with their respective t-ratios and beta coefficients to facilitate direct comparison of the coefficients. Recall that, since time series data are prone to serial correlation, first differencing is introduced to reduce its incidence of non-stationarity in the time series and thereby reduce serial correlation. The computed D-W. statistics indicate that this has been achieved substantially.

Furthermore, the heteroscedasticity is reduced by converting the data to percentage changes. It must be stressed that the above procedures are used under computational facility handicap, because general linear model (GLM) software routines apply the regular normalisation procedures

for treating violations on GLM assumptions.

Although, there appear to be some systematic differences between the results from each set of transformed data, there is similarity in the signs and statistical significance of corresponding coefficients. In both instances where annual data were used for estimation, the coefficients of money supply and exports were statistically significant while those of government expenditure were not. This agrees with the hypothesis that monetary actions are more potent than fiscal policy, in the shortrun. On the other hand, when quarterly data are applied, changes in government expenditure tended to influence gross domestic income very significantly, whether first differences or percentage changes are used. The coefficient for M2, using first differences, is very significant, while with percentage changes, the same coefficient is not significant. Finally, in both cases, the coefficient for EXPT is not significant. This confirms earlier results by Ubogu (1985) such that the exclusion of export variable in this model appear not to weaken the conclusion of greater and more stable potency of monetary actions, relative to fiscal operations, which are more distortionary than achieving the desired impact or direction on the target variables.

TABLE 4. 1.

Summary of Average Annual Rates of Change in Real Gross Domestic Product, Money Supply, Government Expenditure and Export by Phases, 1960 - 1993

Period	Stance Economic Policy	Average Annual Rate of Change (Per cent)				
		GDP	Money Supply (M2)	Govt. Exp. (GEXP)	Exports (EXPT)	Inflation (π)
1960-64	Passive Policy; Monetary and Fiscal Ease	7.3	7.0	0.3	6	3.1
1965-66	Monetary Restraint	7.5	6.5	4.5	15.5	6.9
1967-70	Monetary Ease	15.0	17.3	50.3	15.5	4.9
1971-72	Moderate Restraint	17.5	7.0	14.5	28.5	9.4
1973-77	Monetary and Fiscal Ease	35.0	48.2	57.0	49.6	19.1
1978-85	Monetary Restraint	10.5	14.75	11.5	10.3	17.5
1986-95	Restraint Under SAP And After	29.8	20.25	35.0	76.3	23.7
Overall (1960-95)	Average	17.8	19.5	26.1	20.1	13.7

CHART 4. 1

GROWTH RATE OF SELECTED VARIABLES ON RELATIVE POTENCY OF MONETARY AND FISCAL POLICY
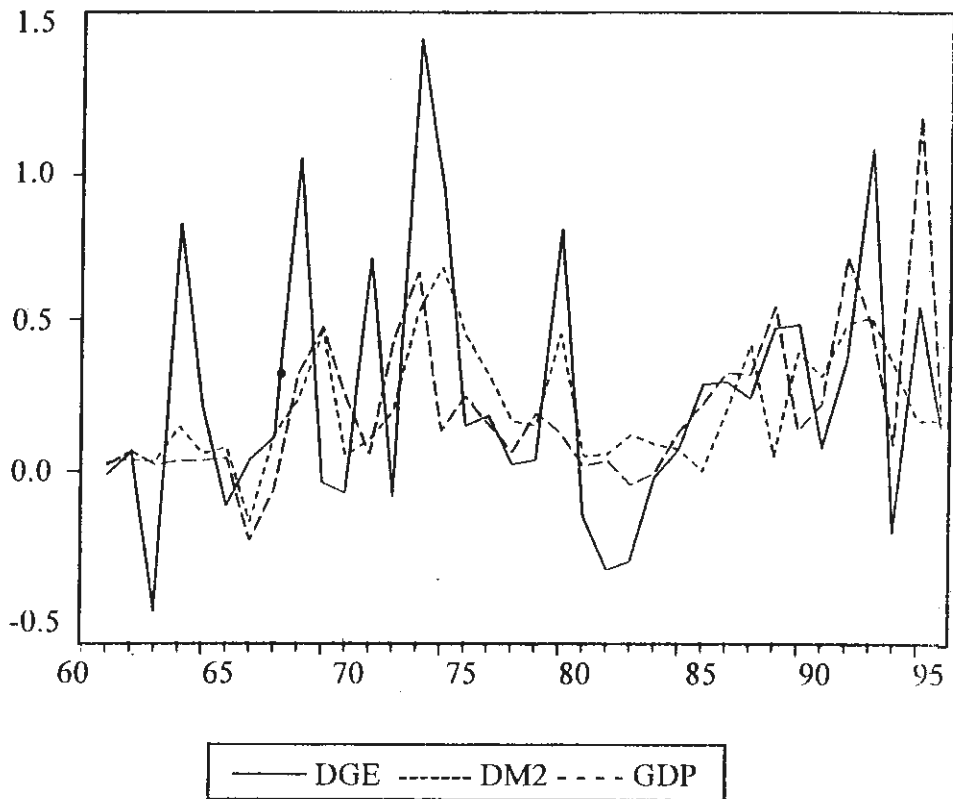
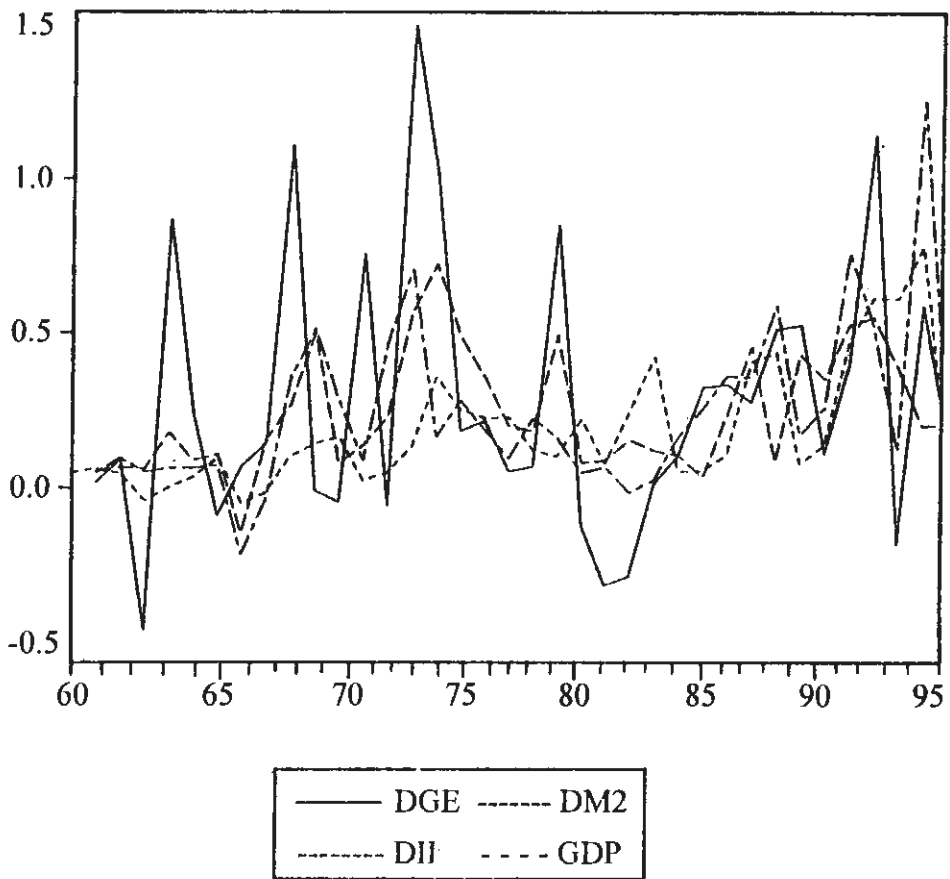# CHART 4. 2

GROWTH RATES INCLUDING SCALED INFLATION RATES

CHART 3
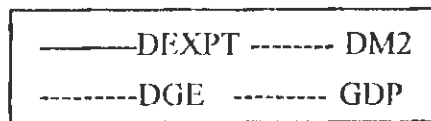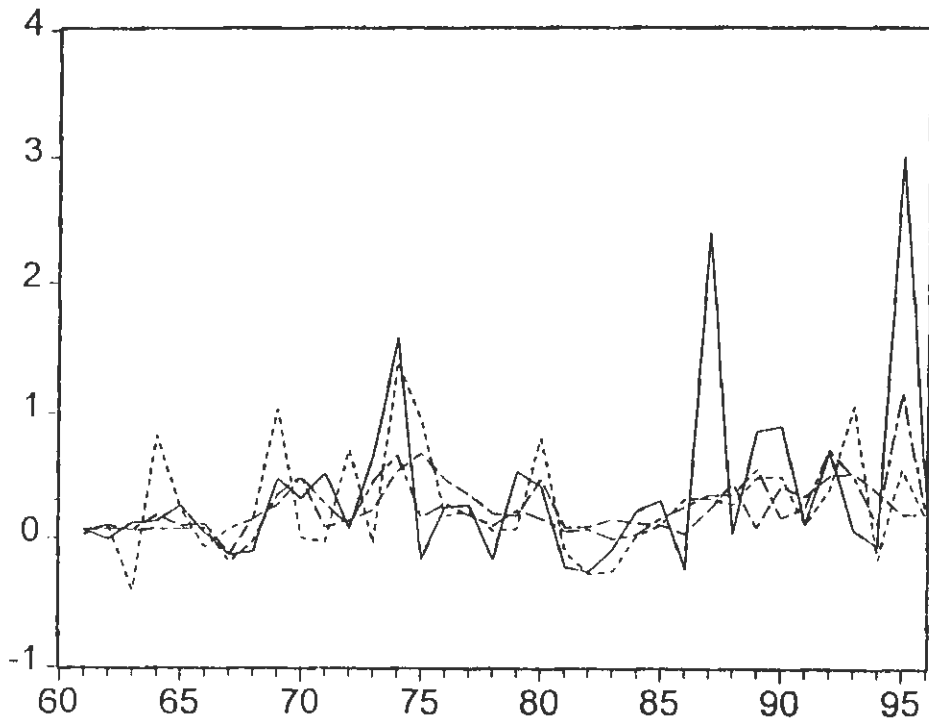
MOVEMENT OF SELECTED VARIABLES

TABLE 4.2

ESTIMATE OF THE MODEL FOR RELATIVE POTENCY OF MONETARY AND FISCAL POLICY

$$GDPT_t = b_0 + b_1 M2_{t-1} + b_2 GE_{t-1} + b_3 EXPT_t + U_t \quad .... (6.3.2)$$

Statistics	Differences			% Changes		
	(a)	(b)	(c)	(a)	(b)	(c)
Const. (b_0)	693.12	-1151.6	-474.5	5.2	1.19	0.0151
	(0.93)	(-0.35)	(-2.36)	(2.0)	(0.36	(0.018)
M2: (b_1)	4.2104**	3.650	0.308**	0.3053	0.66**	0.046
	(7.09)	(7.33)	(6.917)	(2.60)	(4.026)	(0.54)
	[4.818]	[0.841]	__	[0.349]	[1.723]	__
GE: (b_2)	0.1661	0.195	4.473**	0.0136	-0.060	0.964**
	(0.96)	(0.183)	(55.76)	(0.22)	(-0.80)	(18.0)
	[0.38]	[0.025]	__	[0.03]	[0.113]	__
EXPT (b_3)	0.9841**	0.540	0.890	0.225**	0.203	0.0112
	(6.44)	(2.033)	(0.58)	(6.25)	4.60	(1.36)
	[2.979]	[0.156]	__	[0.680]	[0.285]	__
R^2	0.0754	0.929	0.970	0.7235	0.697	0.728
R^2	0.7460	0.921	0.969	0.7181	0.667	0.709
D-W	1.5812	2.651	0.839	1.7529	2.18	1.824
No. Obs.	24	34	134	20	34	134

Notes: 1.   (a)   Used Annual data 1960 - 1986
          (b)   Used Annual data 1960 - 1993
          (c)   Used Quarterly data 1960 - 1993, with appropriate shift variables D60, D71 and D86.

     2.   T-ratios and Beta Coefficients are stated in ordinary and square brackets, respectively, under the regression.

V. SUMMARY , CONCLUSIONS AND POLICY RECOMMENDATIONS.

The relative effectiveness of fiscal and monetary policy has been evaluated by empirically addressing some critical hypotheses of these instruments on intermediate and final target variables of the economy.   In spite of the fact that the Nigerian economy is dualistic, predominant and traditional, with a large rural agricultural sector and small manufacturing sector on one hand, and monoculturally dependent on crude oil exports, it has been possible to specify appropriate models, whose parameter estimates from annual and quarterly data have facilitated the identification, estimation, testing and evaluation of sensitive econometric models that address relative potency of fiscal and monetary policy.

Estimates based on annual data, no matter the nature of transformation (logarithmic, first difference or percentage), confirm the earlier results not withstanding additional years observation; the consistency of the results are, therefore, not in doubt.   However, application of quarterly data showed a more dominating role being played by government expenditure. Unfortunately, the impact most of the time appear to be more distorting with wrong signs, underscoring the need for such expenditures to be co-ordinated and programmed with monetary policy for implementation in favour of productive anti-inflation activities.

For medium to long-term purposes, there is a compelling need to address policy implementation problems such as entrenching implementation fiscal discipline on the basis of accepting and enforcing well-tested and simulated policy recommendations without succumbing to what political exigencies would rather suggest. Furthermore, there is a critical need to adopt a culture of proper fiscal-monetary policy co-ordination using qualitatively and quantitatively derived parameters (via for example, modelling, input output studies etc) borne out of simulation experiments that have intermediate and final target objectives in focus, with correct policy directions always on course in the short run.

For monetary policy, this would supplement the current use of financial programming, which is based on deterministic assumptions which

are sometimes unrealistic.   The complementarity of the econometric approach would account for the behavioural and stochastic aspects of the monetary economy.   This is to assure ultimate long-run arrival at these targets. While doing so, the trade-offs that face policy implementation should be considered and optimization criteria need be applied in the simulation experiments to put in place the least painful scenarios among many options.

There is need to harmonise the outcome of macroeconometric and monetary policy simulation results and forecasts with national financial programming results and prescriptions. Where the former stopped should be the starting point of the latter or they could be done simultaneously for better results. At the moment the two exercises in Nigeria are treated as mutually exclusive with forecasts for the latter being provided by various methods not necessarily macroeconometric or monetary econometric approaches. In doing the harmonisation of policy actions, especially that of fiscal operations and monetary actions, critical areas and variables such as exchange rate, fiscal and monetary policy need not be critically addressed, probably by means of stable monetary authorities reaction functions, using stable and significant reaction function models.   Note that focus need not be on their significance but also and to, a more critical extent, their stability. In general, stability of the models become very critical to ensure their relevance for policy use.

The deviation of their signs from theoretical expectations indicate the pervasive impact of administrative control to which they have been subjected over the period. Since the introduction of SAP in 1986 to the end of the study period, these functions are relatively more unstable.   This aspect needs tackling by sensitizing monetary policy actions that will mop-up excess liquidity by more market-oriented measures through open market operation (OMO) and realistic interest rate policy on one hand and reduction and proper management of budget deficit or surplus expenditure. It is recommended that there should be a consistent fight from both supply and demand side plus political approach i.e. political and policy stability. Coordination of monetary and fiscal policy imply, among others, fiat monetary restraint which should be matched with lower deficit spending.

Where deficits must be, they should be strictly applied to productive ventures and not financed by central bank. This means tilting the deficit budgeting to surplus budgeting or at the worst balanced budget. This can be achieved through evolving an efficient taxation policy, adequate to beat tax evasions, avoidance and inequity. The coordination of monetary and fiscal actions should go beyond deterministic financial programming and budgeting which is based on heuristic assumptions. It should rather be informed by forecasts and evaluation results of econometric and statistical models from robust specifications and sound statistical bases.

Finally, the weakness of the effectiveness of policies especially since SAP (monetary and fiscal) in restoring reasonable macroeconomic stability and inducing sustainable growth is attributed to policy distortions, which have been brought about by flaws in their design as well as poor implementation due to lack of polical and moral will. These failures are responsible for large naira depreciation, acceleration of inflation and decline in output and the implied high unemployment rate and poor living conditions in Nigeria. It is expected that adoption of the above recommendation would turn the economy around for the better and make monetary and fiscal policy potent tools for a vibrant economy.

NOTES

2.   See De-Leeuw and Grammlich (1969) Op. Cit. Also see Mc Callum B.T. (1974): 'The Relative Impact of Monetary and Fiscal Policy Instruments: Some Structural-based Estimates, Journal Of Econometrics 2 pp 283 - 299.

3.   Anderson and Jordan (A-J)(1978) study is preceded by Friedman, M. And Meiselman, H. (1969) and both are the focal papers of subsequent studies including the two papers on developing countries.

4.   Batten and Hafer (1983) emphasize that it is not enough to assume that the intercept term captures the effect of other exogenous variables especially for an open economy. They, therefore, include changes in exports unlike Ajayi and Ubogu also used A-J with the modification.

5.   Whereas Ajayi tries out several definitions of money supply and finally selectes M1, Ubogu uses M2. M2 also is the one targeted currently by the monetary authorities in Nigeria, and it is the more all-encompassing.

6.   Batten, D.S. and Hafer, R.W. (1983), op. pp 5 - 8.

7.   For details of some techniques for time series interpolation, see Asogu (1996) and Asogu (1997).

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