Money Supply - Economic Growth Nexus in Nigeria

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ABSTRACT This paper investigates the impact of money supply on economic growth in Nigeria between 1980 and 2006. Applying econometric technique-O.L.S.E, causality test and E.C.M to time series data, the results revealed that although money supply is positively related to growth but the result is however insignificant in the case of GDP growth rates on the choice between contractionary and expansionary money supply.

I. INTRODUCTION

The relationship between money supply and economic growth has been receiving increasing attention than any other subject matter in the field of monetary economics in recent years. Because of the importance of economic growth among the macro-economic objectives of nations (developed and developing), persistent concern has always been given among monetary economist including Mckinnon (1973), Shaw (1973), Fry Mathieson (1980), Odedokun (1997), Levine (1997) and Asogu (1998) to the relationship between money supply and output.

Economists differ on the effect of money supply on economic growth. While some agreed that variation in the quantity of money is the most important determinant of economic growth, and that countries that devote more time to studying the behaviour of aggregate money supply rarely experience much variation in their economic activities (Handler 1997). Others are Skeptical about the role of money or gross national income Robinson (1950, 1952). Kuznet (1955) supports the view that financial markets start growing as the economy approaches the intermediate stage of the growth process and develop once the economy becomes matured. This connotes that economic growth stimulates increased financial development. Steve (1997) and Domigo (2001), explain that there may not be possibility of economic growth without an appropriate level of money supply, credit and appropriate financial conditions in general.

Evidence in the Nigerian economy has shown that since the 1980's some relationship exist between the stock of money and economic growth or economic activity. Over the years, Nigeria has been controlling her economy through variation in her stock of money. Consequent upon the effect of the collapse of oil price in 1981 and the B.O.P deficit experienced during this period, various methods of stabilization ranging from fiscal to monetary policies were used. Interest rates were fixed and these were said to be beneficial to big borrower farmers (Ojo 1989). Ikhide and Alawode (1993) while evaluating the effect of Structural Adjustment Programme (SAP) concluded that reducing money stock through increased interest rates would lower gross National product. Thus, the notion that stock of money varies with economic activities applies to the Nigerian economy (Laidler 1993). The output development and other economic growth process (via interest rate deregulation) in the Nigerian economy calls for considerable test of the validity of Friedman and Mieselman (1963) work on the Nigerian economy. The implication of the stability of the relationship between money and economic growth will show the effectiveness of monetary policy following the conventional Hicksian IS-LM analysis.

This paper thus aims to investigate the relationship as well as determine the impact of money supply on economic growth. The scope of the study is between 1980 and 2006 and the paper is divided into four sections. Section I is the introduction while section II is on review of past studies. Section III houses the methodology while section IV centers on empirical results and discussion of findings. Section V is the concluding remarks.

II. REVIEW OF RELATED LITERATURES

As already explained money supply exerts considerable influence on economic activity in

both developed and developing economies. The low level of supply of monetary aggregates in general and money stock in particular had been responsible for the fundamental failure of many African countries to attain growth and development. Various scholars have laid much of the blame for the failure of monetary policies to translate into economic growth on the government and its agencies as a result of poor implementation and insincerity on the part of policy executors.

Until recently, with the recapitalization in the banking sector which resulted in mergers, acquisitions increased bank branches and innovations of new products and technology coupled with growth in the capital markets, the Nigerian financial system remained by and large relatively underdeveloped because of lack of financial intermediation and financial deepening which the economy requires for sustained growth. In an attempt to link money supply to economic growth recent contributors in the new economic growth literature have considered the role of financial structure, this presupposes that the level of money stock drives economic growth.

These assertions will strictly depend on several macroeconomic variables. Montiel (1995), Emenuga (1996) and Osikoya (1992) all submitted that, possible effect of financial depth (money in circulation) on economic growth can manifest in three channels: (a) improved efficiency of financial intermediation (b) improved efficiency of capital stock and (c) increased national savings rate.

Fishlow (1996), Bardhan (1996) and Horton et al. (1995) among others provide succinct statements of the historical perspective of issues involv-ed and discuss the various implications of received interest in monetary aggregates in the determination of the level of economic growth in developing countries. Prior to the publication of Kuznets' (1955) paper "Economic Growth and Income Inequality" economic development and growth were guided by the belief that the benefits of economic growth will eventually trickle down in such a way as to affect the velocity of monetary aggregate. Modern macro-economic theories of money and economic development seem to agree that there exist a systematic relationship between money and economic development (Bemanke Alan et al. 1992; Ghatak 1995).

However, empirical researches have largely focused on addressing two issues. First, to examine if money could forecast output given predictive power of past values of output. If so,

the second issue is to examine whether such relationship is stable over time or not. Some researchers have found evidence of the predictive ability of monetary aggregates (Beckett and Morris 1992; Krol and Chanian 1993). Though, some of these studies argued that such relationship seems to have changed over time (Becketti and Moris 1992).

Hum (1993), disagrees with the observed causality that runs from money to income using evidence from South African data. Jeong (2000) using Thailand socio-economic survey concludes that growth and inequality are strongly associated with money supply and financial deepening.

Similar studies that have found a strong support for a positive relationship between money supply and growth include (Sims 1972; Weclock 1995; Friedman and Meiselman 1963; Cagan 1956; Christ 1973; Greenwood and Jovanovic 1990 and Heber 1991, 1996) Others include (King and Levine 1993b; Wachtel and Rousseau 1995 and Neusser and Kinglert 1996). Others include Acemoglu and Ziliboti (1997), De-Nardi (2004), Mansor (2005), Townsend and Ueda (2005) and Owoye and Onafowora (2007).

In Nigeria however, the influence of money supply on economic growth can only be taken with mixed reactions. Albeit, several studies have confirmed the significance of money supply and economic growth. Between 1971 and 1975, the growth rate of the economy measured by the real GDP ranged from 21.3% in 1971 to 3.0% in 1975. By 1981, the real GDP grew by 26.8% and remained negative till 1984 (see appendix I). A simple variance analysis shows that between 1971 and 1986, the mean spread of the GDP was 108.7. However, between 1986 and 1994, the real GDP had a variance of 9.1. The variability of the GDP was much higher before deregulation, while it becomes lower during and after the deregulation of the economy.

Both M_1 and M_2 had little correlation with growth of real GDP before deregulation in 1986. M_2 was observed to have a variance of 362.6 and a correlation coefficient of 0.21. The period 1986-1994 had a lower correlation of 0.16 between broad money (M_2) and growth of real GDP. The mean spread of M_2 was 289.2 as against 108.7 for the real GDP. The correlation between M1 and GDP between 1970 and 1986 stood at 0.22 and for 1986-1994, it was 0.33. In essence, the above descriptive analysis does not suggest any strong relation-

ship between monetary aggregates and economic growth in Nigeria.

While attempting to identify the appropriate definition of money in Nigeria, Ojo (1978) adopted Chetty's theoretical approach with the use of 1961-79 data and found that the wider definition of money is more appropriate when measuring national income in the Nigerian economy.

Asogu (1998) examined the influence of money supply and government expenditure on Gross Domestic Product. He adopted the St Louis model on annual and quarterly time series data from 1960 -1995. He finds money supply and export as being significant. This finding according to Asogu corroborates the earlier work of Ajayi (1974) Nwaobi (1999) while examining the interaction between money and output in Nigeria between the periods 1960- 1995. The model assumed the irrelevance of anticipated monetary policy for short run deviations of domestic output from its natural level. The result indicated that unanticipated growth in money supply would have positive effect on output. A clear examination of the above shows that there is no general agreement on the determinant of economic growth in the Nigerian economy.

Findings of Iyoha (1969, 1976) and Taiwo (1990) show that there is a clear relationship between money and economic growth. Others in Nigeria who have confirmed a strong relationship between money supply and growth include (Odedokun 1996; Okedokun 1998; Ojo 1993; Chete 2002 ; Saidu 2007; Owoye and Onafowora 2007).

III. METHODOLOGY

Following McCallum (1991) and Khan (1999), we specify our money supply and economic growth functions as

$$MSS = F(^{Ly}/_P, R) \qquad \dots\dots\dots\dots\dots 1$$

Where MSS = money supply representing the total of demand deposits, time and savings deposit in the economy.

Ly/P = log of real per – capital output as a ratio of GDP to total population

R = Nominal interest rate deflated by price index.

Since the simple growth of AK production function defines aggregate output as a linear function of aggregate money stock. Thus, per capita real GDP is specified as a function of money stock.

$$LY/P = A(L/MSS) \qquad \dots\dots\dots\dots\dots(2)$$

Where LMSS is the logarithm of real per capita money stock.

From the above, four VAR variables will be specified as LYGDP, PGDP, R and LMSS

From eq (1) $MSS = M1 + M2 = M3$ ....(3)
$MSS = MSS/YGDP$

MSS is measured as ratio of broad money to income/ or ratio of bank deposit liabilities to income

$$LY/P = \log(^y/_p), Y = GDP/POP \dots\dots\dots\dots..(4)$$

P = consumer price index

R= real interest rate = $^i/_p$. ....(5)

We can then specify the money supply function as;

$$M3/y = f(\log {}^y/_p, {}^i/_p) \qquad \dots\dots\dots..(6)$$

Bringing equations (2) and (4) together, we derive our output function as

$$\text{Log}(^y/_p) = A(L/MSS) \qquad \dots\dots\dots\dots(7)$$
$$\text{Log}(^y/_p) = A(\log MSS/POP/P) \quad \dots\dots\dots(8)$$

$MSS = (MSS/POP)$ = per capita money stock

$K^* = \log(^K/_p)$ = real per capita stock

Thus, we can specify our output function as

$$GDP/P = f(\log {}^{M3}/_y, {}^i/_p, {}^k/_p) \qquad \dots\dots\dots\dots(9)$$

Where GDP /P = real output

$^{M3}/_y = M = MSS$

$R = {}^i/_p$ = real interest rate.

We can specify the final form of the equation as:

$$ÄGDP/P = a_0 + a_i{}^ÄM + a_2{}^{Äi}/_p + a_3{}^ÄMSS^* + Vt \qquad \dots.(10)$$

If the log of both sides is taken with the exception of real interest rate, we obtain the following explanatory variables.

$$\text{Log}(GDP) = a_0 + a_1\text{Log}(M) + a_2 R + a_3 \log(MSS)^* + Vt \qquad \dots...(11)$$

Data for the study was culled majorly from CBN publications (various issues), F.O.S, I.M.F. and World Bank African development indicates and Development Reports. Both descriptive and inferential analyses of the Ordinary Least Square Method (OLS) were used in this study. Also to determine the impact and relationship of money supply on economic growth, the Vector Auto Regression (VAR) technique was made use of. The Granger causality test was used to determine the direction of causality between money supply and growth.

IV. EMPIRICAL RESULTS AND DISCUSSION

In this section, the model presented in section

III, equations 10 and 11 are analysed econo-metrically based on the empirical results and findings.

The O.L.S result shows that money supply is conctractionary and this indicates a negative relationship between Gross Domestic product (GDP) and money supply rate. By inference, as Gross Domestic Product increases, money supply falls and the coefficient is statistically insignificant. This outcome however negates some earlier findings in the literature that posit a positive relationship between money supply and growth. With R^2 of 0.62, 62 percent of the variation in GDP is accounted for by MSS. However, the F-test of 13.90 was found to be significant at 5 percent level of significance which indicates that the overall equations and the parameters estimates are significant and the regression line performs well.

Results from table 2 show that the real variable equations significant in measuring growth proxied by real GDP are lagged money GDP ratio and structural adjustment dummy. Consistent with the

Table 1: O.L.S. Result on money supply and economic growth.

Variable	Estimated Co-efficient	Standard Error	t-test
Constant	0.7611	2.147	0.3545
GDP	0.7563	0.2696	2.805
(MSS)	- 0.0546	0.5792	- 0.0943

R^2 = 0.6205
Adjusted R^2 = 0.5759
F-test = 13.90*
* indicates significance at 5% level.

Table 2: Regression output

Variables	Equation 10	Equation 11
Constant	- 0.02	1.77
Log of real per capita GDP	0.36 (2.23)**	-
Growth rate of real GDP	0.02(2.20)**	-
Real interest rate	0.05(0.02)	0.63(1.5)
Structural Adjustment Dummy	0.15(1.72)***	-
Lagged Money GDP ratio	0.30(2.6)*	-
Real GDP	-	0.33(7.6)*
Lagged real money Supply	-	0.12(6.1)*
R2	0.71	51.9
D.W.	2.1	2.4

Note: - Values in parenthesis are the corresponding t-value.
* Indicates 1% level of significance
** Indicates 5% level of significance
*** Indicates 10% level of significance

Table 3: Casuality tests based on ECM

Hypothesis	F-form	LM	Lr
È (mss) = 0	415 (.743)	1.57(.667)	1.61
È ( )	1.73 (.201)	2.13(.144)	2.21(1.38)

Note: Significant levels are in brackets

findings of Giovanni (1985), Leite and Makonnen (1986) and deMelo and Tybout (1986), our second econometric analysis shows that real per capita interest rate exerts a positive but insignificant impact on GDP in Nigeria. This outcome is in confinement with the findings of Ndekwu(1998) and Owoye & Onafowora(2007) that high interest rate stimulates supply of savings but high cost of borrowing discourages investment and retards growth in Nigeria. The fact that structural adjustment dummy is positive and a significant determinant of GDP suggests that the totality of the monetary policies is conducive for economic growth in Nigeria.

Our final regression which has real interest rates as the response variable indicates that the significant determinant is real GDP. The findings imply that growth and development in an economy is influenced by the level of money supply.

Causality based on the error correction model is examined for the short run È (GDP) = 0 and È (.) = 0 in the long run. The results show that in the short run the growth rate of money supply do not have a significant and predictive power in explaining the growth of real GDP. Similarly, in the long run, a significant predictive ability could not be uncovered at the 5 percent level.

V. CONCLUSION AND POICY IMPLICATION

This study evaluates the effect of money supply within the institutional framework and basic theoretical   model on economic growth. The findings albeit support that aggregate money supply is positively related to economic growth and development. However, money supply do not have a significant predictive power in explaning the growth of real GDP. Also, the choice between contractionary and expansionary money supply are not significantly responsive to growth as evidenced in the case of GDP growth rate.

Thus, despite the upward adjustment in different monetary aggregates, money supply – economic growth gap still exits. Hence, the monetary authorities should harmonize the two policies (contractionary and expansionary) to

reduce the rate differential between productive and unproductive credit supplied to the economy, in order to enable the productive sector of the economy to increase the flow of output from the private sector.

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APPENDIX

Trend in selected monetary and economic aggregates

Year	M2 Growth	M1 Growth	Real GDP Growth	Lending Rate	GDP Growth Deflator
1970	4.1	3.2	22.1	7.0	4.21
1971	5.8	3.4	21.3	7.0	4.16
1975	68.0	73.5	-3.0	6.0	18.02
1980	46.1	50.1	5.5	7.5	12.17
1985	10.3	8.7	9.4	9.3	3.6
1986	3.2	-1.2	3.1	10.5	-2.03
1987	22.0	13.7	-0.5	17.5	48.87
1988	42.6	41.9	9.9	16.5	21.44
1989	8.0	21.5	7.3	26.8	45.23
1990	40.4	44.9	8.2	25.5	7.09
1991	32.7	32.6	4.7	20.0	18.61
1992	48.9	52.3	3.6	29.8	64.93
1993	53.0	55.1	2.6	32.2	42.41
1994	16.7	13.6	3.8	24.5	12.77
1996 – 2000	14.9	12.8	3.7	21.5	11.65
2000 – 2006	15.4	11.7	3.45	12.0	9.8

Source: Central Bank of Nigeria Statistical Bulletin. (Various Issues).