Bank lending behaviour and economic growth: an empirical analysis with implication for monetary policy formulation in Nigeria

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BANK LENDING BEHAVIOUR AND ECONOMIC GROWTH: AN EMPIRICAL ANALYSIS WITH IMPLICATION FOR MONETARY POLICY FORMULATION IN NIGERIA

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ABSTRACT

Preliminary findings from the empirical analysis show that the banking sector has not supported real sector output growth in its lending policy. The combined effects of risk aversion and infrastructural problem in the real sector represent serious constraints on credit flow to the private sector and the sector's declining marginal product of capital.

Overall, while the banking sector has indeed, succeeded in deposit mobilization, it has nevertheless, not done a good job in its intermediation functions. The analysis further reveals the presence of policy distortions in the system, and its negative influence on banks'lending behaviour. The need to address these distortions cannot be overemphasized if banks are to resume their traditional role of economic development in Nigeria.

JEL Classification Number
E.4, E5, G2

1.   Introduction

Discussions on monetary and financial policy in Nigeria and its impact on financial market have generally focused on the relationship between financial deepening, investment and economic growth. Numerous empirical studies — Mckinnon (1973), Cho and Kang (1999) have established a strong positive correlation between financial deepening and long-run economic growth; although, these studies caution that the transmission mechanism vary between countries. Thus, while Goldsmith (1969), focused on the relationship between financial development and the efficiency of investment, others such as Greenwood and Javanovic (1990), stressed the influence of financial liberalisation on savings and investments and by implication, on long-term growth. Invariably, these studies have generally assumed that increased volume of credit granted by banks, will translate into automatic output growth.

Accordingly, bank lending has been considered very crucial in enhancing output growth in Nigeria, because of the relative underdevelopment of the domestic capital market, and the paucity of direct foreign investment in the non-oil sector of the economy. Consequently, over the years, bank lending channel per se, has been expected to play a significant role in determining the rate of expansion or contraction of private sector investments and output growth.

Against this background, the stance of monetary policy in Nigeria has remained a major focus of public interest, especially since the commencement of financial sector liberalisation in the 1980s, which culminated into the de-regulation of the interest rate regime in 1993. Indeed, public interest in monetary policy is justified by the fact that the public expects policymakers to be concerned about developments in output, as well as price stability. Consequently, given the significant role which the bank lending channel plays in the monetary policy transmission mechanism, measures which tend to induce credit crunch in the banking system have always been resented by the private sector — because of its implications on the availability and cost of credit, while expansionary monetary policy stance by the Central Bank of Nigeria (CBN), has been generally favoured by the organised private sector, despite its inflationary and other macroeconomic implications.

Historically, the Central Bank of Nigeria via its monetary policy circulars had directly controlled the volume and cost of credit in the economy, until the era of financial sector liberalisation in the mid-1980s. Under the direct control regime, the CBN prescribed the

rate of interest and the quantum of credit which banks must allocate to the various sectors of the economy. The prescription of these ceilings were strictly enforced, and therefore, were very binding while they lasted — despite its inherent inefficiency and moral hazard.

The deregulation of Nigeria's financial industry in general, and the interest rate regime in particular, in 1993 meant that the availability of cheap loans to firms and other sundry consumers was no longer on demand; as loan applications became subjected to tough diligence test; in contrast to the status quo ante, when loans were approved by banks mainly to satisfy CBN's regulatory requirement. With de-regulation, the complaints of adverse selection in loan approvals by banks became rife, while lending rates skyrocketed and became significantly, positive in real terms.

While it has been argued by economists such as Kashyyap and Stein (1999), that banks make money by making loans, and not by sitting on securities that offer returns close to the rate banks pay on deposits, the paradox of the Nigerian situation is that , it actually pays the banks to lend to the government than to firms and sundry borrowers, because of the prevalence of high risk premium.

The Study

There is indeed, a growing consensus that banks' preference for lending to the public sector in Nigeria, and thus, the crowding out of the private sector is directly linked with the inefficiency of the private sector on one hand, and the stance of CBN's monetary policy, on the other hand. To this end, this study shall attempt to answer a fundamental policy question — namely: is the lending behaviour of banks sensitive to monetary and fiscal policy regimes in Nigeria and how does this sensitivity impact on long term private sector investment and growth? To answer this question, we shall examine the empirical relationship between bank credit and private sector output, proxied by the output growth in the manufacturing sector. We shall also empirically ascertain the factors which influence banks' lending behaviour in the Nigerian economy.

The rest of the paper is organised as follows: Section II provides a brief review of the empirical literature. Section III presents the econometric models and rationale for the selected variables, Section IV presents the findings and Section V concludes.

Section II — Review of Empirical Literature

Majority of "endogenous growth" models such as Bencivenga and Smith (1991) and Greenwood and Javanovic (1990), focused on cases where the marginal product of capital was assumed to be positive. Based on this framework, banks in developed financial markets have been credited for the significant role which they play in influencing output growth particularly, in the manufacturing sector in developed and emerging market economies. Typically, the relative efficiency in banks' inter-mediation process, rather than the quantum of loans which they actually provided to investors, was identified as the critical factor which influenced output growth. In this regard, the major role expected of banks as financial intermediaries, is in allocating capital to its best possible use, as opposed to making loans available on demand to all and sundry.

Like in most developing countries, banks in Nigeria are also expected to play a key role in economic development, because of the relative under-development of the capital market and the dearth of direct foreign investments. In a study which examined the relative share of capital market contribution to private sector output in Nigeria, Edo (1997), found that the contribution of the capital market to Nigeria's economic growth was very insignificant. While Nnanna and Dogo (1998), reported that the introduction of financial sector liberalization had succeeded in inducing greater financial deepening in Nigeria and greater availability of credit to the private sector, it is still unresolved whether the growth in domestic credit which resulted, has in-fact, translated into an increase in private sector output growth.

Although empirical studies have confirmed a positive relationship between some indicators of financial deepening and growth, much controversy still persists as to how these results should be interpreted by economists (De Gregorio and Guidotti, 1992). Our focus in this study is not only to guage the expansion in domestic credit as a result of financial deepening per se, but also, to investigate the efficiency in the utilization of capital, as measured by the relative change in the rate of output growth in the private sector, arising from the change in domestic credit.

Following De Gregorio and Guidotti (1992), we can organise our discussion by assuming for the sake of simplicity, a production function which depends only on the capital stock as expressed below:

$$Y_t = f(K_t), \dots\dots\dots\dots\dots\dots\dots (1)$$

Where Y_t and K_t denote output and the stock of capital at time (t), respectively. By totally differentiating equation (1) and denoting the rate of growth of output by (Y), the savings rate (dk/y) by S, and the marginal productivity of capital by ($\varnothing$), we obtain:

$$\hat{Y}_t = dk_t/y_t \, f(K_t) = S_t \, \varnothing_t \dots\dots\dots\dots\dots\dots (2)$$

Accordingly, the determination of the marginal product of capital ($\varnothing$), in the Nigerian economy, becomes an empirical question which can be readily ascertained.

Numerous studies such as Romer (1986) and Lucas (1988), including Grossman and Helpman (1991), have placed emphasis on the dynamic process that would drive the economy to a steady-state equilibrium in which output growth would ultimately stop. The assumption of a decreasing marginal productivity of capital is necessary for ensuring convergence to such a steady-state equilibrium. Thus, within the analytical framework of equation (2) a decreasing marginal productivity of capital implies that ($\varnothing$), will decline to zero as K_t increases over time. Typically, systemic factors such as the poor state of infrastructural facilities, obsolete machinery and lack of competitiveness which exist in Nigeria could in fact, give rise to such inefficiency.

However, proponents of endogenous growth model hold contrary views. For example, Mckinnon (1973) and Shaw (1973), have severally, argued that financial development implies not only higher productivity of capital, but also, a higher savings rate and by extension, a higher volume of investment. Against this backdrop, a case has often been made by pro-active policymakers for the dismantling of all policies which lead to financial repression. Nevertheless, the McKinnon-Shaw hypothesis has been disputed by numerous authors including Diaz-Alejandro (1985), whose study of Latin American financial system show that there is no correlation between financial deepening and increased savings, or for that matter, increased investment and output growth.

In their endogenous growth model, Greenwood and Javanovic (1990), demonstrated that, there is a positive two-way casual relationship between output growth and financial

sector development. They opined that, the process of growth stimulates higher borrowing requirements for working capital and investments   - thereby, necessitating the entry and expansion of more banking institutions. While the process of financial intermediation by banks, encourages investment projects to be financed more efficiently   - thereby, stimulating investment and growth.

Overall, a fundamental conclusion in the empirical literature seems to favour an affirmation of the positive correlation between financial liberalization and credit expansion and by extension, enhanced output growth.

The role which interest rate plays in banks' lending behaviour has been discussed extensively in the literature. Greene and Villanueve (1991), have established a strong negative correlation between real interest rates and private investment, while Gelb (1989), also found no relationship between growth in aggregate investment and real interest rate. However, Calvo and Guidotti (1991), provided some explanation for these counter-intuitive findings. According to the authors, very low and negative real interest rates tend to cause financial disintermediation, with consequence on output reduction as implied by the McKinnon-Shaw hypothesis. Furthermore, they argued that artificially low interest rate may create an excess demand for funds, such that investors may have to be rationed, and consequently, banks may face problems or may lack the incentive to allocate available credit to the most efficient projects.

Overall, they posited that, very high real interest rate that do not reflect improved efficiency in investment, but rather, a lack of credibility of economic policy or various forms of country risk, are likely to result in lower level of investment as well as a concentration in excessively risky projects. We tend to subscribe to this synthesis because it aptly describes the Nigerian condition. Hence, given the significant influence of real interest rate ($\check{R}$) in the credit market; we shall also include this variable as an argument in the analytical framework of this study.

Section III — The Analytical Model: Data and Methodology

The dearth of direct foreign investment flows particularly, to the non-oil sector and the relative under-development of the capital market strongly imply that the banking system shall remain the major provider of capital to the private sector in the Nigerian economy in the foreseeable future. The formal private sector of the economy is dominated by the

manufacturing sector. Its contribution to the real gross domestic product has averaged over 12.0 per cent over the years. Typically, the manufacturing sector is the major recipient of bank credit, compared with other non-oil sectors of the economy. Against this background, we postulate that all things being equal, the higher the level of bank credit to the private sector (BCP), poxied by the manufacturing sector, the higher its output growth (ψ).

In addition to exploring the impact of real interest rate on aggregate bank credit to the private sector, and its impact on long-run growth, we also evaluate the explanatory power of the following exogenous variables:

(i)   The Minimum Rediscount Rate (MRR). The MRR is the interest rate at which deposit money banks can borrow from the CBN when in need of liquidity. Generally, the MRR is regarded as the nominal anchor which drives other rates, but anecdotal evidence suggests that the MRR has little influence on the cost of wholesale credit in the economy. The MRR is generally perceived as a penal rate and is policy-driven. Hence, monetary policy distortion can easily arise if and when the MRR fails to transmit the appropriate policy signal by distorting the cost of fund of the marginal bank. This distortion can be measured by the gap between banks' prime lending rate and the MRR, which we define as DMR[1]. Accordingly, we hypothesize that the wider the DMR, the lower the growth in bank credit to the private sector. Similarly, the DMR also reflects the country risk premium and transaction costs in Nigeria.

(ii) The differential between the prime lending rate and the savings deposit rate (DPS)[2] can also influence banks' intermediation role. The DPS captures the arbitrage premium, and it is a yardstick for measuring how efficiently banks can play their intermediation role. Thus, if the proposition that banks make money by granting credit and not by sitting on their deposits is true, then it should be expected that a large DPS should favour greater expansion of credit overtime. Consequently, we hypothesize that the wider the DPS, the greater the growth in bank credit to the private sector, and vice versa.

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1   DMR – PLR   MRR
    where
    PLR = Prime lending rate

2   DPS = PLR – SDR
    where
    SDR =Savings deposit rate
    DPS measures distortion in the interest rate regime (the arbitrage premium)

Following the tradition in the empirical literature we have also included a measure of liquidity, specifically, broad money (M_2), as an explanatory variable to gauge the impact of monetary policy on banks' lending behaviour. We hypothesize that the greater the rate of expansion in M_2, the higher the level of liquidity in the banking system, and all things being equal, the greater the flow of credit to the private sector.

Finally, an accurate description of banks' lending behaviour in Nigeria should necessarily, capture the role which expectation plays in the flow of credit to the private sector. Typically, banks' lending behaviour is influenced by their past experience. Thus, the volume of credit advanced by banks in period (t_2), will be influenced by the degree of success achieved in the recovery of loans in period (t_1). All things being equal, a good loan recovery effort by banks in period (t_1), will induce them to expand their credit levels in period (t_2) and vice versa. To capture this adaptive expectational behaviour, we have also included the explanatory variable (BCP-e) in this study.

To summarize, the determinants of bank credit to the private sector in Nigeria may be written as:

$$BCP_t \quad = \quad f(\Psi_t, \check{R}_t, DMR_t, DPS_t, M2_t, BCP\text{-}e + U_t) \quad \text{......................} \quad (3)$$

Where:

BCP_t = Bank Credit to the Private Sector

Ψ_t = Private sector output (Proxied by the index of manufacturing production)

$\check{R}_t$ = Real interest rate (Prime lending deflated by rate of inflation)

DMR_t = Policy distortion

DPS_t = Arbitrage premium (Market distortion)

$M2_t$ = Growth in broad money supply, and

$BCP\text{-}e$ = Lagged value of BCP_t, a proxy for banks' adaptive expectation

U_t = Error term (Gaussian white noise).

Overall, equation (3), relates banks' credit to the private sector to six (6) explanatory variables, with private sector output growth (ψ), as the variable of major focus in the study. Operationally, equation (3) may be expressed in a log linear estimation form as:

$$LogBCP_t = ao = b_1 log\psi_t = b_2 logR_t = b_3 logDMR_t$$

$$B4logDPSt + b5logM2t + b6log +$$

$$BCPt{-}1 \ldots\ldots\ldots + Ut \ldots\ldots\ldots\ldots (4)$$

Our a priori expectations are as follows:

$$a_1 < 0, a_2 < 0, a_3 < 0, a_4 < 0, a_5 < 0, a_6 < 0$$

The specification of equation (4) in a log-linear format will enable us to interpret the regression co-efficients in terms of elasticities, which is appropriate for the empirical analysis. The a priori expectation of negative correlation between bank credit to the private sector output and all, but two explanatory variables, underscores the likelihood of a decreasing marginal productivity of capital in Nigeria, arising from monetary policy, market distortions, as well as systemic constraints.

The annual time-series data employed in this study were derived from the *Statistical Bulletins* of the CBN (various issues); and publications of the *Federal Office of Statistics* (FOS), where applicable. The study covers the period 1970 – 99. The analysis was carried out by means of ordinary least square (OLS), method. A further sensitivity analysis using two-stage least squares and vector auto regression (VAR), was carried out to ascertain whether the various empirical results were influenced by the econometric methods.

Section IV — Empirical Results

The study adopted the OLS, two-stage least squares (TSLS) and the VAR estimation techniques. The OLS method was estimated with and without the assumption of adaptive expectation by the economic agents. The results of the empirical analysis are shown below:

TABLE 1

RESULTS FROM OLS

Variable	LBCP	LBCP
ψ	−0.2948*	0.2053*
	(0.0260)	(0.0281)
LR	0.2470**	0.0508
	(0.0770)	(0.6327)
DMR	-1.0359	0.8641
	(0.6863)	(0.6229)
LDPS	-3.2862	−1.2189
	(0.1690)	(0.4535)
LM2	1.1201*	0.5067*
	(0.0000)	(0.0003)
Lagged dependent variable		0.5581*
		(0.0000)
C	0.1427	0.1005
	(0.1055)	(0.6168)
R-squared	0.9951	0.9977
Adj. R-squared	0.9940	0.9971
D-W	1.36	2.3
Prob (F)	0.0000	0.0000
Their Inequality Coefficient	0.006965	0.0044
B-G Serial Correlation	0.18489	0.2116
LM Test	0.36845	0.3103
ARCH TEST	0.12536	0.7452

*(**) = Significance at 5 (10) per cent

Generally, the overall regression as measured by the F-statistics, was significant and the explanatory power of the model as measured by the coefficient of determination (R_2), was also significant. The hypothesis that financial deepening and deregulation will lead to the expansion of output growth is not confirmed in this study, as evidenced by the negative coefficient (Ψ). Nigeria's experience appears to be similar to those of Latin America, as reported by Diaz-Alejandro (1985).

The coefficients for real interest rate and M_2 are correctly signed and statistically significant. It corroborates the received wisdom which has long established a strong positive influence of real interest rate and expansionary monetary policy on bank credit. The coefficients for policy and country risk (DMR) and arbitrage distortion (DPS), are correctly signed --- though statistically insignificant. Nevertheless, they are indicative of the oligopolistic structure of Nigeria's banking industry, as well as the relative ineffectiveness of the MRR as a nominal anchor for interest rate management.

These results are however, not conclusive. The D-W statistics are not significant thus, indicating the presence of residual correlation. This was confirmed by the Breusch-Godfrey LM test and the auto regression conditional Heteroskedasticity (ACRH), tests which are not significant. In the model, the null hypothesis that the coefficients of DMR and DPS were not zero cannot he rejected. In which case, they might not have explained variations in bank lending to the private sector.

The Two-Equation System

As a result of the above observation, the two-stage least squares (TSLS), estimation technique was performed, with most of the exogenous variables used as instruments. The objective was to derive structural coefficients that are both consistent and asymptotically efficient. The specification emphasized the effect of bank lending on output, by specifying the output variable as endogenous, as follows:

$L\Psi = f(LBCP)$

$LBCP = f(LR, LDMR, LDPS, LM_2, LBCP - 1)$

Results

TABLE 2

RESULTS OF THE 2-STAGE LEAST SQUARES

	Lψ (With lag in instrument	Lψ (Without lag)
LBCP	0.262-0*	0.2767*
C	(0.0000)	(0.0000)
	2.0598	1.9064
Adj. R-squared	0.73	0.76
Prob (F)	0.72	0.75
	0.0000	0.0000
B-G Serial Corr. LM Test	0.0000	0.0000
Their Inequality Coeff.	0.032	0.032
ARCH Test	0.0177	0.0047

It is noteworthy that the result from the two stage test least squares also confirmed a significant relationship between output growth and bank lending in Nigeria. However, the coefficient does not carry the expected sign. In the circumstance, it is difficult to explain at what timeframe the decreasing return to capital sets in.

Finally, in order to ascertain the medium to long-term impact of bank credit on output growth, the unrestricted Vector auto regression (VAR), model of the form

$Xt = C(L)xt-1 + et$

Where

$XT =$ Vector of endogenous variables

$C(L) = ak^{-th}$ degree matrix polynomial in lay operator L

$(C =$ square matrices),

$E =$ white noise error term

was also estimated. The use of VAR allows us to examine the effect of different assumptions, vis-a-vis the contemporaneous interactions of the selected variables -- especially, the interactions of bank credit and output, without imposing any constraints on the particular channel through which the variables interact.

TABLE 3
RESULTS FROM UNRESTRICTED VAR

Variable	LBCP	LΨ	LR	LDMR	LDPS	LM2
LBCP (−1)	0.0465	−0.1904	0.3072	−0.0146	0.0061	−0.1858
	(0.2174)	(−0.5367)	(0.4897)	(0.4897)	(0.1928)	(−0.5148)
LBCP (−2)	0.0588	−0.4316	0.0496	−0.0076	0.0079	0.0987
	(0.3654)	(−1.6169)**	(0.1051)	(−0.3323)	(0.3335)	(0.3634)
LΨ (−1)	−0.0567	0.6453	−0.0058	0.0477	0.0151	0.2528
	(−0.3895)	(2.6737)*	(−0.0136)	(2.3029)*	(0.7011)	(1.0292)
LΨ (−2)	−0.2731	−0.0815	−0.1385	−0.0426	−0.0246	−0.2259
	(−2.0433)*	(−0.3682)	(−0.3536)	(−2.2418)*	(−1.2469)	(−1.0023)
LR (−1)	−0.1180	0.2628	0.1661	−0.0212	−0.0171	−0.0668
	(−1.2346)	(1.6591)**	(0.5929)	(−1.5578)	(−1.2104)	(−0.4144)
LR (−2)	0.1967	0.0488	−0.3785	−0.0136	0.0057	0.1156
	(2.1231)*	(0.3178)	(−1.3938)	(−1.0362)	(0.4230)	(0.7399)
LDMR (−1)	0.3388	3.4393	2.8885	−0.1393	0.4199	0.6879
	(−0.2243)	(1.1992)	(0.5696)	(−0.5648)	(1.6418)**	(−0.2356)
LDMR (−2)	3.2109	0.2451	3.5355	0.08525	0.4662	−0.1328
	(1.7723)**	(0.0816)	(0.6661)	(0.3303)	(1.7416)**	(−0.0435)
LDPS (−1)	−0.4826	0.0404	−0.0059	0.3898	0.5891	3.3367
	(−0.2866)	(0.0145)	(−0.0012)	(1.6259)	(2.3681)*	(1.1753)
LDPS (−2)	−0.9205	−9.0272	−3.3333	0.3314	−0.4487	−0.4911
	(−0.3289)	(1.9471)*	(−0.4066)	(0.8314)	(−1.0853)	(−0.1041)
LM1 (−1)	0.8498	0.3369	−0.4537	−0.0135	0.01191	1.3429
	(5.0973)*	(1.2199)	(−0.9291)	(−0.5686)	(0.4833)	(4.7767)*
LM2 (−2)	0.1426	0.3983	0.0971	0.0378	−0.0226	−0.2813
	(0.5387)	(0.9084)	(0.1253)	(1.0038)	(−0.5782)	(−0.6301)
C	0.0965	0.6917	0.7179	−0.0562	0.0228	0.16600
	(0.4966)	(2.1469)*	(1.2603)	(−2.0298)*	(0.7932)	(0.4881)
R²	0.998	0.963	0.3674	0.8218	0.8616	0.9966
R²(ADJ.)	0.997	0.931	−0.1747	0.6690	0.7429	0.9937
Log	37.8395	24.2072	8.8176	90.4569	89.4651	23.7289
Likelihood	−4.6678	−3.6680	−2.5280	−8.5754	−8.5019	−3.6326
Akaike AIC	−4.0539	−3.0441	−1.9041	−7.9515	−7.8780	−3.0087
Schwarz SC						

*(**) = Significance at 5 (10) per cent.

Evidently, there is a significant relationship between bank lending behaviour and output growth. The finding suggests that in the medium-term (defined as a period of two years and beyond), the decline in output has negative influence on bank credit to the private sector and vice versa. However, there is evidence that positive real interest rate regime and expansionary monetary policy will induce greater bank credit to the private sector, in both the short and medium term. Similarly, the impact of policy distortion and inappropriate interest rate regime, were found to have significant negative impact on credit expansion in the medium term.

Concluding Remarks

The VAR model met the standard econometric test. Nevertheless, the coefficients should be interpreted with caution because the observation period which was not sufficiently long could have constrained the degree of freedom, thus rendering the use of Vector Error Correction (VEC), inappropriate. We therefore recommend the use of quarterly time series data for future investigations. Overall, the preliminary findings reveal the presence of high risk aversion by banks in Nigeria and the ineffectiveness of the MRR as the nominal anchor interest rate.

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