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Financial Stability and Credit Creation in Nigeria: An Econometric Evaluation

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Abstract	*The study empirically examines a co-integrated model of financial stability of Nigerian financial sector in relation to credit financing over the sample period 1990 to 2016. The methodology of error correction was adopted in the study. The study found that credit financing and financial stability are positively linked. Nevertheless, with ecm coefficient of 1.798, the Nigeria's financial system is unstable; any short run disturbance to the nation's financial sector will not be restored in the nearest future. Moreover, the coefficient of financial depth is negative implying instability in money supply. As a result, level of the Nigeria's financial deepening does not enhance the stability of the country's financial sector. In effect, narrow financial depth causes instability of financial system in Nigeria. So, need arises for resistant and robust institutional advancement of the financial sector, while resilient emphasis on fund enlistment is needed. Also, government should ensure the adherence to credit policy by the banks*
Key words	Credit creation, financial stability, Sector, Nigeria
	JEL Codes: E51, C62

1. Introduction

Credit creation is one of furthermost vivacious operations of commercial banks. The creation of credit stands in twofold, when customer deposits cash with commercial banks, and when banks advance loans, discount bills, deliver overdraft facilities and make deposit investments via bonds and securities (Soludo, 2009). The principle holds that loans extended by a bank to its borrowers culminate in creation of deposits in favour of borrowers and so supplement means of payment with same borrowers.

Hence, by giving loans, a bank creates deposit liabilities and thus adds to the means of payments, that is, money supply. Accordingly, input of banks to money supply is in the formula of bank deposits. The loan deposits subsequently created are secondary deposits or derived deposits. Arithmetically, accumulation to money supply is equivalent to surplus of its deposit liabilities over its cash holdings. As this accumulation occurs via loan-advancing operation of banks, the process is credit creation.

Some economists advance a credit crunch thesis associating it to institutional constraint or too restrictive monetary policy of central bank (Adrian and Shin, 2010b) while others use exchange rate instability and changes in financial assets prices as variables of financial assets. In Nigeria, banks account for over eighty percent of financial system assets and dominate the stock market (Aderibigbe, 2004).

According to Schinasi (2006), financial instability occurs when shocks to system dramatically worsen information problems for financial intermediation between savings and investment opportunities breaks down. Financial instability posed global concern due to explosion of financial crises in Africa and Asia. In Nigeria, financial sector failure has been attributed to indiscreet credit lending. Hence, we seek to empirically evaluate effect of credit financing in financial stability in Nigeria.

2. Literature review

The prospect of financial markets in influencing real economic activity has been acknowledged in the macroeconomic literature. A number of studies have shown that credit frictions amplifies macroeconomic fluctuations by certain shocks, hence the credit frictions are described as "financial accelerator" (Leijonhufvud, 2009; Khan, 2011).

To Yinka (2009), the intermediation financial institution role can be said to be a catalyst for financial stability. Wasmer and Weil (2004) examine the causal relationship between financial intermediation and financial stability in Egypt during the period 1960-2001 using a tri-variate VAR framework ad found bidirectional effect.

Levine (2002) and Agénor *et al.* (2004) asserted that in countries with high levels of financial exclusion, the informal financial services which households and firms rely are poor substitutes for formal services. Arnold *et al.* (2006) have presented evidence on the industry effects of bank lending in Germany and identifies the industry effects of bank lending associated with modifications in monetary policy.

To Borio and Lowe (2002) and Dattels *et al.* (2010), banks with strong balance sheets maintain lending certainly during the global financial crisis. In particular, banks that depend on market funding coupled with lesser structural liquidity could

reduce credit supply than others. It has been argued that financial intermediation stimulates the funding of liquidity needs through credit lines (Crowley, 2008).

However, in the view of Fadare (2011), easy credit as bridge of the gap between haves and have-never could costly redistributes and cause instability in financial system. Evidence with respect to Chilean banks also suggests that greater financial inclusion in terms of access to credit creation and expansion coincide with greater financial stability at the level of providers of financial services (Cincotti *et al*., 2010).

The study by Guglielmo *et al*. (2009) shows financial depth is deficient in some Europe countries and so contribution of relatively weak credit market to growth has been limited with only a minor positive effect of some financial indicators.

3. Methodology of research

3.1. Economic theory

The financial-accelerator theory which exhibits an endogenous development in credit markets drives this study. The mechanism involves the link between "external finance premium which is the change between cost of funds raised superficially and the opportunity cost of funds internal to the firm and the net worth of potential borrowers which is borrowers' liquid assets together with collateral value of illiquid assets less outstanding obligations (Eichengreen, 2004).

With credit-market frictions present and borrowers have diminutive wealth to contribute to project financing, divergence of interests between the borrower and the suppliers of external funds is greater, implying increased agency costs; in equilibrium, lenders must be compensated by higher agency costs by a larger premium.

To the extent that borrowers' net worth is pro-cyclical, the external finance premium will be countercyclical, enhancing swings in lending and investment, spending, and production. The theory recognizes three agents namely, households, entrepreneurs, and retailers. In addition, the theory includes a government, which implements policy.

3.2. Model specification

The study systematically estimated an error correction model. We specify the bivariate *VAR(1)* model for:

$$F_t = \Pi_1 F_{t-1} + \epsilon_t \tag{1}$$

With *VECM* representation given as:

$$\Delta F_t = \Pi F_{t-1} + \epsilon_t \tag{2}$$

Such that $\Pi = \Pi_1 - I_2$ and with a (2×1) vector of parameters, we have:

$$\beta = \begin{pmatrix} \beta_1 \\ \beta_2 \end{pmatrix}$$

$$\beta' F_t = \beta_1 f_{1t} + \beta_2 f_{2t} \ \square \ I(0) \tag{3}$$

Using the normalization $\beta_1 = 1$ and $\beta_2 = -\beta$, the co-integrating relation becomes:

$$\beta' F_t = f_{1t} - \beta f_{2t} \tag{4}$$

This normalization suggests the stochastic long-run equilibrium relation:

$$f_{1t} = \beta f_{2t} + e_t \tag{5}$$

In view of F_t co-integrated with one co-integrating vector, rank (Π) = 1 so that:

$$\Pi = \varpi \beta' = \begin{pmatrix} \varpi_1 \\ \varpi_2 \end{pmatrix} \begin{pmatrix} 1 & -\beta \end{pmatrix} = \begin{pmatrix} \varpi_1 & -\varpi_1 \beta \\ \varpi_2 & -\varpi_2 \beta \end{pmatrix} \tag{6}$$

The elements are coefficients of the speed of adjustment such that the co-integrated *VAR* becomes:

$$\Delta F_t = \varpi \beta' F_{t-1} + \mu_t \tag{7}$$

Writing the *VECM* equation by equation gives

$$\Delta f_{1t} = \varpi_1 (f_{1t-1} - \beta f_{2t-1}) + \mu_{1t}$$
$$\Delta f_{2t} = \varpi_2 (f_{1t-1} - \beta f_{2t-1}) + \mu_{2t}$$

In effect, $\beta' F_t$ obeys an $AR(1)$ process of which:

$$\beta' F_{t-1} + \varepsilon_t \beta' F_t = (1 + \beta'\delta)\beta' F_{t-1} + \beta'\mu_t$$
$$\Rightarrow e_t = \phi e_{t-1} + v_t, \ e_t = \beta' F_t$$
$$\Rightarrow \phi = 1 + \beta'\varpi = 1 + (\varpi_1 - \beta\varpi_2)$$
$$\Rightarrow v_t = \beta'\mu_t = e_{1t} - \beta e_{2t}$$

The stability condition is thus derived when:

$$|\phi| = |1 + (\varpi_1 - \beta\varpi_2)| < 1 \tag{8}$$

The unrestricted constant and trend vector error correction model is thus obtained as:

$$\Delta F_t = \gamma_0 + \gamma_{1t} + \varpi\beta' F_{t-1} + \Gamma_1 \Delta F_{t-1} + ... + \Gamma_{p-1}\Delta F_{t-p+1} + \varphi ECM + \mu_t \tag{9}$$

Where F is financial stability as measured by the ratio of bank capital to asset, F_{t-1} is the credit creation of banking sector, ECM is error correction term, μ_t is error term. The control variable of financial deepening *(M)* which is the ratio of broad money supply to *GDP* is encompassed in estimation.

4. Method of data analysis

The study tested for co-integration, given that variables are co-integrated, if they share common trend. We utilized the Johansen's methodology for testing for co-integration which entails the specification and estimation of a *VAR(p)* model for F_t, construction of probability ratio for rank of Π to decide quantity of co-integrating vectors and if necessary, impose normalization and identifying restrictions on co-integrating vectors.

The unrestricted co-integrated *VECM* is denoted *H(r)*. The *I(1)* model *H(r)* is formulated on condition that the rank of Π<r. This creates nested *VAR* models:

$$H(0) \subset ... \subset H(r) \subset ... \subset H(n),$$
$$H(0) = no - coitegrated \ VAR$$
$$H(n) = Stationary \ VAR(p) \tag{10}$$

Johansen's method tests the nested hypotheses:

$$H_0(r) : r = r_0 \quad vs. \quad H_1(r_0) : r > r_0 \tag{11}$$

The trace statistic is given by:

$$LR_{trace}(r_0) = -N \sum_{i=r_0+1}^{n} \ln(1 - \hat{\theta}_i) \tag{12}$$

If rank (Π)=r_0 then $\hat{\theta}_{r_0+1,...}, \hat{\theta}$ ought to be close to zero and $LR_{trace}(r_0)$ should be small since $\ln(1 - \hat{\theta}_i) \approx 0$ for $i > r_0$. In comparison, if rank $(\Pi) > r_0$ some of $\hat{\theta}_{r_0+1,...}, \hat{\theta}$ will be nonzero, less than one and $LR_{trace}(r_0)$ should be large since $\ln(1 - \hat{\theta}_i) << 0$ for some $i > r_0$.

The co integration of variables makes it possible to investigate short run relationship between variables in the study using error-correction model in examining the presence of equilibrium or disequilibrium between short run dynamics and long run

equilibrium. The study measures financial stability by ratio of bank capital to asset and credit creation of banks as a ratio of gross domestic product. The data were found from bulletin of CBN for the period, 1996 to 2015.

5. Empirical evaluation

The ADF statistics which ascertain if the variables are level stationary or first difference (pictured in table 1):

Table 1. Unit Root Test of Variables

Variables	ADF Statistics	Critical Value	Remark
$Ln(F_{t-1})$	2.208	2.359	Non-stationary
$Ln(F)$	1.766	2.359	Non-stationary
$Ln(M)$	1.732	2.359	Non-stationary
$\Delta Ln(F_{t-1})$	5.361	2.959	Stationary
$\Delta Ln(F)$	8.249	2.962	Stationary
$\Delta Ln(M)$	9.537	2.962	Stationary

From the results, no variable was stationary in level; however, after differencing them once, they became stationary. Accordingly, credit creation and ratio of bank capital to asset are I (1). The results of Johansen co-integration test are shown in table 2:

Table 2. Johansen Co-integration Test Results

Hypothesized no. of EC(s)	Eigenvalue	Likelihood Ratio	Critical values 5% (1%)	Remark
None**	0.6390	59.1980	47.21 (54.46)	Co-integrated
At most 1	0.4565	27.5765	29.68 (35.65)	Not co-integrated
At most 2	0.2295	8.6697	15.41 (20.04)	Not co-integrated
At most 3	0.0187	0.5856	3.76 (6.65)	Not co-integrated

From the result above, the null hypothesis of no co-integration between the selected variables is rejectable. The likelihood ratio of 59.1980 exceeds 5% and 1% critical value. This implies one co-integrating equation, which is an evidence of co-integrating relationship.

Table 3. Short-run Results for Financial Stability

Variables	Coefficients	p-value
C	1.656 (1.959)	0.026
$\Delta Ln(F)$	1.847^{G} (5.629)	0.000
$\Delta Ln(F_{t-1})$	1.293^{G} (7.286)	0.000
$\Delta Ln(M)$	-0.145^{W} (-1.036)	1.232
CointEq1	1.798^{W} (2.146)	0.002
Unadj. R^2 Adj. R^2 F-statistic DW-Stat.	0.926 0.859 15.727 2.003	0.000
[G] Significant at 1%, [W] significant at 5% t- value in bracket		

The error correction results in Table 3 show 99% of the systematic variation in financial stability was explained by variation in credit to the private and public sectors and financial depth of the country. Impact of financial depth was insignificant with t-value, 1.036. The coefficient of financial depth (-0.145) is negative. Accordingly, there is instability in money supply and such instability has not contributed positively to the stability of the country's financial sector. As a result, level of the Nigeria's financial deepening does not enhance the stability of the country's financial sector. Impact of credit was significant at 1%. The results show one-period lag error correction with positive coefficient and significant with a t-ratio of 2.946; suggesting that the Nigeria's financial system is unstable, in fact it is in permanent disequilibrium over time. This shows that any short run shock in Nigeria's financial sector will not be restored in the long-run.

6. Conclusions

The study explores empirically the impact of credit creation on financial stability in Nigeria. The empirical findings include, credit creation of the banking sector has a positive ad significant control on financial stability in Nigeria, Nigeria's financial system is unstable, any short run shock in Nigeria's financial sector will not be restored in the short-run and financial depth of Nigerian economy is yet to enhance the stability of the country's financial sector. In effect, narrow financial depth causes instability of financial system in Nigeria. Credit creation and financial stability are intimately linked, with potentially vital consequences for macroeconomic performance. Flouting the link concerning the two exposes the country to many financial crises. So, need arises for a resistant and robust institutional advancement of the financial sector, a resilient emphasis on fund enlistment is needed to stabilize the country's financial system. Government should ensure the adherence to credit policy by the banks.

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