

# MONEY MARKET EFFICIENCY AND THE DEVELOPMENT OF NIGERIAN FINANCIAL SYSTEM

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## Abstract

*This study empirically assesses the effects of money market efficiency on the development of Nigerian Financial system, using annual data collated from 1991 - 2017. The study utilizes money market variables (Interest Rate Spread, Interest Expenses, Loan/loss Provisions) as measures of money market efficiency while real gross domestic product (RGDP) was employed as the control variable. Financial deepening (M2/GDP) was used as proxy for financial system development with the adoption of multivariate OLS analysis for the estimation process, co-integration analysis for long-run relationship and the associated error correction model (ECM) to determine the short-run impact of the variables. The Granger causality test is used to determine the direction of causality among the variables. The study found that there is a significant positive relationship between money market efficiency with reference to interest expense and financial system development both in the short-run and long-run respectively; an indication that high interest expenses remain a major challenge in achieving financial system development in Nigeria. However, we could not establish any significant relationship between financial systems development and other efficiency measures namely interest rate spread, and loan/loss provision. The study recommends that monetary authorities should monitor the activities of banks by ensuring that they are properly run in line with prudential regulations to improve efficiency via reduction in interest expenses, and costs of loan/loss provision. Also, they should build capacities in the real sector of the economy to spur up the real domestic product which is a necessary ingredient for the development of Nigeria's financial system.*

**Keywords:** Money Market Efficiency, Money Market, Financial System, Co-integration

**JEL code:** M41, M42

## Introduction

The role of efficient money market in the development of the financial system cannot be overemphasized. Money market is essential in building a sustainable financial system and an open vibrant economic system. Countries with well developed financial institutions tend to experience accelerated growth. Financial system is a complex and well integrated set of financial institutions, markets, instruments and services which facilitate the transfer and allocation of funds efficiently and effectively within the economy. The financial systems of most developing countries are characterized by co-existence and co-operation between the formal and informal financial sectors. Similar trend is seen in Nigeria financial system (Babajide, 2011). The functions of a financial system include mobilizing and allocating savings, monitoring corporate performance, providing payment and settlement systems, optimal allocation of risk bearing and reduction, disseminating price-related information, offering portfolio adjustment facilities, lowering costs of transaction, promoting the process of deepening and broadening the financial system. It is important to state here that for proper functioning of the system legal and financial framework should be well regulated. According to the Central Bank of Nigeria (1993), the Nigerian financial system refers to a set of rules and regulations and the aggregation of financial arrangements, institutions, agents, that interplay with each other and the rest of the world to foster economic growth and

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development of a nation. The financial system fosters economic development through various institutional structures (Nzotta & Okereke, 2009). The financial system is very important such that if it is left weak, the economy suffers for it ultimately. The focus of this study is the money market which represents the short end of the financial system charged with the responsibility of providing short term investment having a maturity date of less than one year. Money market plays the intermediation role of making available short-term financial assets that are close substitutes for money in the market. This is done primarily by mobilizing domestic savings for productive investments as well as providing government and or her agencies with funds to facilitate developmental projects and the money market must function in this role efficiently in order to have optimal result for all the parties involved in transactions. This study seeks to appraise the impact of money market efficiency on the development of Nigerian Financial System. The main objective therefore is to ascertain the relationship between money market efficiency and development of Nigerian financial system. Specifically, the study evaluates the effect and direction of causality between money market efficiency indicators (interest expense, interest rate spread, loan/loss provision) and financial system development in Nigerian. The rest of this paper is structured as follows: the first three sections contain the literature review, the methodology and data presentation, analyses and discussion of findings. The last section is the conclusion and recommendations.

### **1. Literature Review and Theoretical Framework**

According to Goldsmith (1969), financial system development is of prime importance because the financial superstructure, in the form of both primary and secondary securities, accelerates economic growth and improves economic performance. Financial system facilitates the movement of funds to the place in the economic system where the funds will yield the highest social return. Consequently, ensuring that funds are not available to inefficient funds users. In helping as a vehicle for economic development, the financial system tries to achieve the basic function of resource intermediation. Various institutional structures ensure that idle funds are allocated to entrepreneurs, businesses, households and governments, for investments and use in various projects and purposes, with a view to earning of returns. The financial system is a prime mover of economic growth and development. It achieves this through the intermediation process offered mainly by the money market, which entails providing a medium of exchange necessary for specialization and the mobilization of savings from surplus units to deficit units. Through this process, there is an enhanced productive activity and thus positively influences aggregate output and economic growth, needless to mention the job creation capacity which is part of the positive fruits of an efficient money market.

#### **The Nigerian Financial System**

A system is generally seen as comprising component parts or subsystems that work in harmony in order to achieve certain goals or objectives. Therefore, according to Nzotta & Okereke (2009), a financial system consists of different institutions, markets, instruments, and operators that interact within an economy to provide financial services such as resource mobilization and allocation, financial intermediation and facilitation of foreign exchange transactions.

The Nigerian financial sector can be classified into two categories namely;

1. The informal sector which comprises of the local money lenders, the thrifts and savings associations, and so on. It is poorly developed, limited in reach, and not integrated into the formal financial system, but plays a major role in the Nigerian financial system.

2. The formal financial system comprises of the capital and money market institutions and these comprise of the banks and non-banks financial institutions (Aderibigbe, 2004).

According to the CBN Annual Report and Statement of Account (2008), the Nigerian (formal) financial system consists of the Central Bank of Nigeria (CBN), the Nigerian Deposit insurance Corporation (NDIC), the Securities and Exchange Commission (SEC), the National

Insurance Commission (NAICOM), the National Pension Commission (NPC), Deposit Money Banks, Microfinance Banks, Finance Companies, Bureau-De-Change (BDC), Stock Exchange, Commodity Exchange, Primary Mortgage Institutions, Development Finance Institutions (such as Bank of Industry), Discount Houses and Insurance Companies and Registered Insurance Brokers. The focus of this paper is on the formal sector. The Deposit Money Banks (DMBs) accept deposits, provide loans and advances to customers, operate the payment and settlement mechanism and also create money through providing loans and advances. There has been special attention of the regulatory bodies (that is CBN and NDIC) on the activities of these banks since they have a great impact on the soundness and stability of the financial system which has to be sustained. There has also been rapid growth in terms of service delivery, size and number of institutions, which later declined from 89 in 2004 to 25 in 2006 and further reduction due to the consolidation of banks to the present 24 (including one non-interest bank). The money market was not in existence in Nigeria prior to the establishment of the Central Bank of Nigeria in 1958, although some forms of market for short-term funds did exist. Therefore, before the advent of commercial banking, there existed some elements of short-term lending and borrowing based on commercial paper. The market was an integral part of the London money market. It worked by moving funds from London to Nigeria during the harvesting season in order to finance the export of produce and at the end of the season, the funds were moved back to London, in other words there was all-season money-market activity. The establishment of the Nigerian money market saw the Central Bank of Nigeria harnessing those funds towards the country's economic growth. It is important at this juncture to state that the ultimate role of the money market is to facilitate the mobilization of funds from the surplus units (savers) to the deficit units (investors). The sweetener is interest income that makes the surplus units (savers) to transfer their purchasing power to the deficit units (investors). The efficiency with which resources flow from lenders to borrowers for the production of goods and services is a reflection of development of the financial system. To what extent the efficiency of the Nigerian money market impacts the development of the Nigerian financial system is the focus of this paper.

### **Hypotheses**

The study tested the following hypotheses which are stated in a null form:

1. There is no significant relationship between money market efficiency indicators (interest expense, interest rate spread and loan/loss provision) and financial system development in Nigeria.
2. There is no causal relationship between money market efficiency indicators ( interest expense, interest rate spread and loan/loss provision) and financial system development in Nigeria.

### **Methodology**

The study covers the period of 26 years (1991 -2017). Data used are sourced from the Central Bank of Nigeria's statistical bulletin of relevant editions and Nigeria Deposit Insurance Corporation's Annual Reports and Accounts for the period under review. The multivariate regression analysis and granger causality test were used to analyze the data. Other tests like Johansen multivariate co- integration test and Augmented Dickey-Fuller (ADF) unit root tests were utilized in the study. The error correction mechanism (ECM) is employed to assess the short run effects while Johansen co-integrating estimation technique is employed in order to ascertain the long run effects of money market efficiency indicators on financial system development. The test for causality was carried out using the pair wise Granger causality test to know the direction of causality between money market efficiency and financial system development variables.

**Model Specification**

The objective of this study is to investigate relationship between money market efficiency indicators (interest expense, interest rate spread, and loan/loss provision) and financial system development in Nigeria. The dependent variable, Financial System Development (FINS<sub>D</sub>) denoted by M2/ RGDP (financial deepening). The explanatory variables are interest rate spread, interest expense, loan-loss provision. RGDP was deployed as the control variable. Putting this into functional form therefore becomes;

$$FINS_D = f(INTRS, INTEX, LLPROV, RGDP) \dots\dots\dots 1$$

The econometric form of equation 1 is represented as:

$$FINS_D = \beta_0 + \beta_1 (INTRS) + \beta_2 (INTEX) + \beta_3 (LLPROV) + \beta_4 (RGDP) + \mathcal{E} \dots\dots 2$$

Where;

- FINS<sub>D</sub>* = Financial System Development (Financial deepening (M2/GDP) )
- INTRS* = Interest rate Spread (Prime Lending Rate (PLR) minus Interest on deposits)
- INTEX* = Interest Expenses (taken as intermediation cost)
- LLPROV* = Loan-Loss Provisions
- RGDP* = Real Gross Domestic Product
- $\mathcal{E}$  = Stochastic disturbance (error term)
- $\beta_0$  = Intercept of relationship in the model/constant
- $\beta_1 - \beta_4$  = coefficients of each of the independent variables
- A priori expectations-  $\beta_1, \beta_3, \beta_2 < 0; \beta_4 > 0$

**Data presentation and analysis and discussion of findings**

The data utilized in this study were derived from the CBN’s statistical bulletins and NDIC’s annual reports for the period covering 1991 -2017. The full complements of the preliminary tests; the co-integration and causality tests are contained in the appendices.

**Unit Root Analysis**

Unit root test was conducted as a way of investigating non-stationarity in the variables used, in other words, it was deployed to identify the presence or otherwise of unit roots. Therefore, to avoid the possible occurrence of spurious regression parameters (Gordon, 1995), the Augumented Dickey Fuller test (ADF) was used. The results are presented in levels and first difference format on the table below:

**Table 1. Unit Root Table**

	Variables at levels			Variables at 1 <sup>st</sup> difference		
Variables	ADF Test Statistics	Critical Values	Remarks	ADF Test Statistics	Critical Values	Remarks
M2/GDP	-2.175	-3.612	Non-stationary	-4.326	-3.622	Stationary, I(1)
INTRS	-3.726	-3.612	Stationary	-5.793	-3.633	Stationary, I(1)
INTEX	-4.539	-3.674	Stationary	-4.496	-3.691	Stationary, I(1)
LLPROV	-3.449	-3.612	Non-stationary	-6.062	-3.622	Stationary, I(1)
RGDP	-1.543	-3.612	Non-stationary	-4.267	-3.622	Stationary, I(1)

Source: Researchers’ Results (2018) extracted from E-views 8.0

From table 1, two of the variables (LLPROV and RGDP) were not stationary at levels as their absolute values were less than their respective critical values. However, at first

difference, the absolute values became higher than their critical values, hence, they all became integrated of order one.

### Co-integration Test

Sequel to the fact that the series in the analyses above are stationary in their first difference, we proceeded to ascertain the co-integration status of the model. The study used Johansen Co-integration methodology and computed the trace and maximum Eigen values/ statistics to establish/ ascertain the existence of long-run stable relationship among the variables. This method was used due to its rich multivariate estimations.

**Table 2. Johansen Multivariate Co-integration Test Results**

Trace Test		
Null Hypothesis	Test Statistics	Critical Value
$r = 0^*$	76.67	69.82
$r \leq 1$	45.17	47.86
$r \leq 2$	25.72	29.8
$r \leq 3$	12.99	15.49
$r \leq 4$	2.54	3.84

Source: Researchers' Results (2018) extracted from E-views 8.0

\* denotes rejection of the hypothesis at 5% significance level.

Result from above table shows that trace statistic has one co-integrating vector at the 0.05 level. Therefore, the null hypothesis of no co-integration was rejected by the study, thus there is a long run stable relationship between money market efficiency indicators and financial system development.

### The Parsimonious ECM estimates

**Table 3. Dependent Variable: M2/GDP (Financial Deepening, proxy for Financial System Development)**

Variables	Coefficient	Std-Error	T-ratio	Prob.
C	-0.6246	1.0005	-0.6243	0.5412
INTRS	-0.2317	0.1587	-1.4603	0.1636
INTEX	0.0204	0.0055	3.6963	0.0020
LLPROV	-0.5004	0.2817	-1.7765	0.0947
RGDP	2.35E-07	4.36E-07	0.5383	0.5978
ECM(-1)	-0.5405	0.2532	-2.1348	0.0486
R-squared	0.7561			
$\check{R}$	0.6646			
F-statistic	8.2647			
Durbin Watson stat.	1.8794			

Source: Researchers' Results (2018) extracted from E-views 8.0

The coefficient of determination is 0.7561 that is, 75.6% systematic variation in financial system development is due to the variation in the included regressors, while the remaining 24.4% is due to Gaussian White noise. However, when the coefficient of determination was adjusted for the degree of freedom, the explained variation became 66.5%. Thus, judging by  $R^2$  and the adjusted ( $\check{R}^2$ ), the estimated model has both explanatory power and predictive ability. The F statistic of 8.26 is statistically significant at 1% level; this explains that the explanatory variables are linearly related to the dependent variable. The coefficient of ECM being negative and

statistically significant shows that an established relationship between the short run dynamics and long run equilibrium of the model is realizable. This shows there is 54% possibility of reverting to long run equilibrium in case of disequilibrium.

The Durbin-Watson statistic was 1.8794 ( $\approx 2$ ), shows the absence of auto-correlation or first order serial dependence. Therefore, in the absence of any other assumptions of the OLS, the estimated parameters are adjudged to having optimal desirable properties. In line with a priori expectation of all, money market efficiency determinants, only Interest Expenses (INTEX) has a positive and statistically significant impact on financial development, the positive relationship is contrary to a priori expectation; this shows that high interest expenses remain a major incentive to financial system development in Nigeria. Interest Rate Spread (INTRS) and Loan/Loss Provisions (LLPROV) are negatively related to financial system development in line with the a priori expectations, although the relationships are not statistically significant, thus, these indicate that these variables play some roles in promoting financial system development, but their impact is not statistically significant in promoting financial system development. Real Gross Domestic product (RGDP) has a positive but not statistically significant impact on financial development. This confirms the a priori expectation and it is an indication of the positive role the national economy plays in the promotion of financial system development.

### Long Run Analysis

Having analyzed the short run results, we shall present our estimated long run results as contained on table 4 below:

**Table 4. Estimated long run results**

Variables	Coefficient	Std-Error	T-ratio	Prob.
<b>C</b>	19.8615	7.7187	2.5732	0.0191
<b>INTRS</b>	-0.0962	0.1659	-0.5799	0.5692
<b>INTEX</b>	0.0164	0.0045	3.6710	0.0017
<b>LLPROV</b>	-0.5034	0.2864	-1.7575	0.0958
<b>RGDP</b>	-2.14E-07	2.39E-07	-0.8956	0.3823
<b>ECM(-1)</b>	0.7902	0.2167	3.6476	0.0018
<b>R-squared</b>	0.8579			
<b><math>\bar{R}</math></b>	0.8184			
<b>F-statistic</b>	21.7299			
<b>Durbin Watson stat.</b>	2.0847			

Source: Researchers' Results (2018) extracted from E-views 8.0

The results on the table 4 above, show strong adjusted R-square of approximately 82%, indicating that about 82% change in dependent variable (FINSD) is explained by changes in the explanatory variables (INTRS, INTEX, LLPROV and RGDP). The f-statistic value of 21.72 is quite significant at the 1 percent level, thus the hypothesis of a significant linear relationship between the independent variables and financial system development (FINSD) is validated. The Durbin Watson statistic of 2.0847 ( $\approx 2$ ) shows that there is no serial correlation in the estimated model, thus making it amenable for policy perspectives. On the basis of the individual statistical significant of the model, as shown by the probability value, the result reveals that in the long run, only INTEX shows significant impact on financial system development with less impact from RGDP, all the other determinants of money market efficiency (value of Interest Rate Spread and Loan/loss Provision) do not impact significantly

on economic development in Nigeria. In terms of the *a priori* sign, values of interest rate spread, loan/loss provision were correctly signed (negative), the negative relationship exhibited by its coefficient indicates that, a decrease in interest rate spread and loan/loss provision would enhance financial system development in the long run.

**Table 5. Granger Causality Test Results**

<b>Null Hypothesis:</b>	<b>F-Statistic</b>	<b>Prob.</b>	<b>Decision</b>	<b>Causality</b>
<i>INTEX does not Granger Cause M2_GDP</i>	0.06356	0.9386	Reject	None
<i>M2_GDP does not Granger Cause INTEX</i>	0.75398	0.4848	Reject	
<i>INTRS does not Granger Cause M2_GDP</i>	2.31396	0.1275	Reject	None
<i>M2_GDP does not Granger Cause INTRS</i>	1.23234	0.3151	Reject	
<i>LLPROV does not Granger Cause M2_GDP</i>	0.26138	0.7729	Reject	None
<i>M2_GDP does not Granger Cause LLPROV</i>	0.77892	0.4738	Reject	
<i>RGDP does not Granger Cause M2_GDP</i>	6.98775	0.0057	Accept	Bi-directional
<i>M2_GDP does not Granger Cause RGDP</i>	12.2371	0.0004	Accept	

Source: Researchers' Results (2018) extracted from E-views 8.0

The results of the Granger causality tests are reported in Table 5 above. The F-test is conducted on the null hypotheses in order to determine the direction of causality between each pair of variables. The null hypothesis is rejected based on the significance of the F-value for the particular relationship. The Granger causality tests results reveals that there is no causal link between the following: financial system development (FINSD) and interest expense (INTEX) as well as financial system development (FINSD) and interest rate spread (INTRS) plus financial system development (FINSD) and loan-loss provision (LLPROV). Therefore, the null hypotheses of no causal or reverse effects between FINSD and INTEX as well as FINSD and INTRS plus FINSD and LLPROV are accepted. However, a bidirectional causal relationship is found to run from real gross domestic product (RGDP) to financial system development (FINSD), without a feedback effect. It thus shows that financial system development responds to changes in gross domestic product and vice versa. Therefore, fluctuations in gross domestic product are expected to exert strong effects on financial system development in Nigeria and the reverse is also true. This is in line with theory and the results of previous studies.

### **Conclusion and recommendations**

Nigerian financial system has been widely acclaimed as the “most dynamic and diversified in Sub-Sahara Africa” (World Bank, 1993); but it is however bedeviled with challenges bearing on its efficiency and effectiveness. Arising from various analytical tools employed in this study, the results suggest that in both the short-run and long-run, interest expense (INTEX) has a positive and statistically significant relationship with financial system development. This is in line with our *a priori* expectation and shows that high interest expense is a major factor that affects financial system development in Nigeria. Furthermore, Real Gross Domestic Product (RGDP), has a positive but not statistically significant effect on financial system development in the short run. However, reverse is the case in the long run. This is in line with our *a priori* expectation and a proof of positive role RGDP plays in the development of Nigeria’s financial system. The study also found that RGDP and financial system development have causative impact on each other, this finding agrees with some earlier studies. Both Interest rate spread (INTRS) and Loan/loss provision (LLPROV) have

negative relationship with financial system development. It is important however to note that the negative values for these two variables are not statistically significant, meaning that they still present some potential in the development of our financial system. We proposed the following recommendations based on the findings of the study.

1. The need for Nigeria to develop her economy in order to improve the nation's RGDP which is sine qua non to having a well-developed financial system. The policy thrust in this regard could be tagged against the present drive towards the diversification of our economy and free it from the present huge dependence on oil foreign exchange revenue.

2. Financial institution as major drivers of the economy should be prudent in area of interest expenses (INTEX). This is against the backdrop that high interest expenses represent high cost of funds that is inimical to money market efficiency. In the light of this, the policy suggestion here is that banks should maintain the right mix of deposits liabilities, that is lay more emphasis on cheap funds ( such as demand deposits and savings) than expensive funds ( term deposits).

3. Maintaining the right mix (as stated above) is the major way to improve interest rate spread INTRS (difference between interest income and interest expenses), with greater focus on cheap funds and good negotiation on the risk assets (loans and advances) side, increased interest rate spread would invariably impact positively on banks' earnings and by extension a well developed and sustainable financial system.

4. In the area of loan/loss provisions (LLPROV), proper monitoring and banks' adherence to prudential guidelines by regulatory authorities would assist in reducing banks' loan/loss provision which could help the development of the financial sector. Proper classification of non-performing loans (NPLs) assets into watch list, sub-standard, doubtful and loss would assist in raising red flags when the needs arise and also assist in preventing bad debt build up. This will invariably reduce the 'cost-effect' of loan/loss provisions on banks.

5. Other recommendations include the following;

- a. The monitoring and supervisory roles of the monetary authorities should be intensified with workable and sustainable templates, in other words, CBN and NDIC should increase their on-field and off-field supervision of financial institutions, keeping tab with regular stress tests, most especially on cost (efficiency), liquidity and credit prudential enforcement as mentioned above. They should function more in a proactive manner rather than reactionary.
- b. Monetary authorities in conjunction with bankers committee should also come up with a template which would relax certain credit requirements which appear to have stifled the loan market, this will help build up the retail and small and medium scale enterprises which will assist in building a strong economy and by implication develop our financial system.

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