

# Shadow Banking and Central Bank's Growth Support Initiative in Nigeria: Facts and the Evidence<sup>1</sup>

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## Abstract

The empirical evidence about shadow banking and central bank's monetary intervention to improve liquidity in Nigeria remains largely anecdotal. However, the role played by both in the build-up to and aftermath of the 2007 – 2009 global financial crises, mostly in the advanced economies is thoroughly acknowledged in the literature. This paper investigates the dynamic relationship between shadow banks in Nigeria and central bank's monetary policy, using the ARDL Bounds testing approach to cointegration. The study reveals the existence of a short run association, but not so in the long run which reveals the absence of a standard condition, implying little or no relationship between shadow monetary policy and shadow banking. This study, therefore, recommends that the central bank continues to be innovative in the ways shadow banks are incentivized in order to improve financial inclusion.

**Keywords:** Shadow Banking, Shadow Monetary Policy, ARDL Cointegration, Error-Correction, Growth Supporting Intervention, Bounds Test, Financial Inclusion,

**JEL Classification:** G20, G21, G22, G23, G28

## 1.0 Introduction

Shadow banking is a regulatory arbitrage, where maturity, credit and liquidity transformations are conducted without recourse to the central bank's credit window and transactions are largely outside the purview of regulatory constraints that bound the traditional banking sector. Claessens and Stijn (2014), Mehrling, Pozsar, Sweeney and Neilson (2012) described shadow banking as "*all financial activities, with the exception of traditional banking, that depend on backstops to operate*". In effect, any financial activity outside the conventional banking system involving the intermediation of public or private funds is functioning in the shadow. However, the term "shadow" in the context of financial institutions can be misleading, as it seemingly conveys a "sinister activity", even when this is not the case.

Shadow banking, as a result of being operationally invisible to regulators in some advanced economies, or due to the absence of comprehensive statutory regulation/supervision have been directly identified, as the main culprit behind the 2007-2009 global financial crisis (The Great Recession), highlighting the systemic risk they potentially pose to the financial economy in a given run. In spite of this, shadow banks play crucial roles in the economy, especially in developing countries, performing non-traditional financial intermediation functions outside those provided by the conventional banking sector and capital market (Claessens, Pozsar, Ratnovski and Singh, 2012).

In Nigeria, as in most African countries, informal thrift and credit societies have performed credit transformation roles for years in rural and semi-urban areas, where there is little or no banking presence. Although, not as sophisticated as the hedge funds, the modus operandi of the informal thrift society mimics that of the hedge funds, but lacks the accompanying reporting or operating requirements. Ironically, while shadow banking is generally understood as providing financial and financial-related services outside the mainstream traditional banking system, it does not operate in complete isolation, as the formal banking sector is usually the main player in the realm, deploying exotic and usually ambiguous special vehicles for extending profit making opportunities beyond the traditional loan and loanable products.

Paradoxically, shadow banking was fostered within the bosom of the traditional banking system, in direct collusion with investment banks securitized and repackaged collateralized assets like mortgage and auto loans, for the sole purpose of reselling to shadow banking institutions like pension funds, insurance companies, hedge funds, mutual funds; etc., which are ultimately responsible for funding and sustaining the shadow banking system, notably in the advanced economies. The intermediate products usually come in form of collateralized debt obligations, asset-backed securities, mortgage-backed securities and collateralized loan obligations.

In this paper, we follow Lombardi and Zhu (2014)'s description of shadow monetary policy as the Central Bank's unconventional monetary policy tools deployed for the purpose of meeting its core mandate at the zero lower bound of interest (ZLB) or negative inflation rates (NIRs), when conventional tools could no longer be relied upon to deliver a targeted policy outcome. The array of creative policy instruments employed by

<sup>1</sup> The views expressed in this paper by the Authors do not in any way represent the official position of the Central Bank of Nigeria.

central banks in the advanced economies, especially following the recent Great Recession, famously referred to as Quantitative Easing is considered shadow monetary policy instrument. Quantitative Easing (QE) refers to steps taken by the central banks to ease monetary conditions and improve capital flows in the economy (Lombardi and Zhu, 2014). Quantitative Easing could take the form of massive asset/securities purchases by a central bank or prolonging of maturity on asset/securities held by the Bank in order to reduce liquidity pressure on the issuer. In Nigeria, as in other frontiers, shadow monetary policy does not come directly in the traditional form just described above, but through other avenues, like development intervention funds, Open Buy Back guarantees of government securities backed assets, etc.

The rest of the paper is structured as follows: Section 2 reviews existing work on shadow banking, its monetary policy implications, and stylized facts. It compares and contrasts alternative arguments on the pros and cons of shadow banking, either as an alternative financial intermediation medium or a harbinger of monetary policy failure; sections 3 and 4 deal with research methodology and analysis of data, respectively, while Conclusions and policy recommendations are the subjects of sections 5.

## 2.0. Theoretical and Empirical Literature Review

Whereas a substantial body of research is dedicated to the study of shadow banking, shadow monetary policy, however, seems to have attracted little attention, especially in terms of its deployment as a potent policy tool. In cases where research on shadow banking is done, the study is usually limited to the United States or few other advanced economies. Yet, its importance is underscored by Pozsar, Adrian, Adam, and Boesky, (2012)<sup>1</sup> who documented the institutional features of shadow banks vis-à-vis their economic roles and relations to the conventional banking system. The paper concluded that unless a creative approach is taken to herd shadow banks into the monetary authority's regulatory realm, the increased capital and liquidity standards for depository and insurance institutions would continue to drive returns to shadow banks, thus further increasing shadow activities and broadening efficacy gap in monetary policy.

While the intensity and volume of shadow banking activities in Nigeria remains small compared to that of the United States or any other advanced country with more matured capital and derivatives markets, the growing sophistication of financial instruments in Nigeria is certain to add impetus to shadow banking activities in the country in the years to come. Li, Hsu, and Tian, (2012) studying China's shadow banking system, concluded that the continuous tightening stance by the Peoples Bank of China has been strengthening the growth of shadow banking system in the country, consequently, they concluded that this proliferation of shadow banks has a weakening effects on monetary policy. Since the financial environment and monetary policy regime in Nigeria bear some similarities to that of China, both being emerging economies, this conclusion could also be true for Nigeria. In a related study, Li, Hsu, and Qin, (2014), using a bank stress test to analyze solvency risks within those termed "systemically important financial institutions", directly stemming from shadow banking activities, found that both solvency and liquidity risks are real existential risks that the banking sector as a whole faces, as a result of the activities of shadow banks.

Acharya, Khandwala, and Öncü, (2013) studied the determinants of the growth of non-bank financial corporations in India, otherwise referred to as the systemically important sector by the Bank of India and found that a substantial portion of the non-bank financial institutions' liability originated from commercial banks' lending, in effect affirming the direct roles of conventional banks in sustaining the shadow banking system in the country. Where shadow banks operate, shadow monetary policy is unlikely to be far behind. Mishkin and Estrella (1997) found that since 1979, U.S monetary aggregates had largely failed to be useful as information variable for policy makers; claiming that these variables, could not be relied on for monetary policy purposes. Even before then, attention had been shifting towards other "more helpful" policy indicators. In consonance with this shift, Bernanke and Blinder (1992) held that the interest rate paid on federal funds was actually informative and can directly predict future directions of real macroeconomic variables.

Within the Nigerian environment, Awoyemi and Jabar (2014) examined the relationship between the prime lending rates and Microfinance banks, using descriptive statistics, they found that high rates hamper the ability of Microfinance banks<sup>2</sup> (erstwhile Society banks) to perform effective credit or maturity transformation roles, for which the sub-industry was established. While it can theoretically help improve their bottomline, shadow banks' high lending rates discourage potential borrowers from patronizing unconventional banks, thus defeating the very purpose of the existence of this industry.

Studying the shadow bank's role in triggering crisis and subsequent contagion effects, Petria, (2012), averred that, the shadow banking system emerged as a direct consequence of banking industry deregulation

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<sup>1</sup> This study was part of the Federal Reserve Bank of New York's Staff Reports, # 458 in 2012. It was first published in July 2010 but revised in February 2014.

<sup>2</sup> As at December 2006, all existing Society banks were required to transform into Microfinance banks, and have been operating as such ever since.

coupled with the desire of market agents to leverage on the unrestricted opportunity to circumvent the regulatory restrictions in the traditional banking system. In Nigeria, the portion of commercial banks total loans going to the Small and Medium Scale Enterprises has been shrinking (see figure 2). In 1992, while this important sector was able to secure more than 27 per cent of loans issued by commercial banks, it could barely eke out 1 per cent since 2006. Incidentally, the sector accounted for only 0.99 per cent of total loans from commercial banks in 2014, dropping to 0.14 per cent in 2015, indicating a deep financing gap, and leaving room for non-traditional banking sources to fill the vacuum. Since the much needed funding gap ought to be filled, shadow banks have a role in the financial intermediation process. However, there is a section of shadow banking, solely servicing the formal sector, including the commercial banking sector, with no regard to formal or informal small scale enterprises.

Calmes and Theoret (2011), using a Canadian dataset to study the risk-return trade-off associated with shadow banking activities, corresponding with the evolution of the endogeneity of banks' decision to enlarge their market-oriented business lines, found a structural break in the year 1997 (the advent of the great recession) which invariably coincides with an increased impact of endogeneity on banks' returns and coincidentally on returns on assets (ROA) and subsequently, an upsurge in banking risk.

Literature remains scanty on shadow monetary policy, however, in an attempt at comparison with conventional policy tools, Marco Japodo Lombardi and Feng Zhu (2004) proposed a shadow policy rate that directly mimicked the federal funds rate, although, using structural vector autoregressive models (SVAR). They averred that their estimated shadow rate provides a gauge of the Federal Reserve's monetary policy stance when interest rate at the zero lower bound (ZLB) becomes binding. Peersman (2011) estimated the effects of traditional interest rate innovations and unconventional (shadow) monetary policy actions on the Euro area economy. He found that the region can stimulate its economy beyond the policy rate by increasing the size of its balance sheet.

Conversely, Moe (2012) reviewed the recent expansion of central bank liquidity injection to mitigate crisis, as well as the relationship between the Central Bank and the fiscal authority, the author posited that there is a potential threat to the Central Bank's independence, if they continued to be involved in excessive balance sheet expansion, especially in areas that are not traditionally associated with Central Bank's direct sphere of statutory responsibility.

### **2.1. Stylized Facts and Perspectives on Shadow Banking and Growth Support Initiatives in Nigeria**

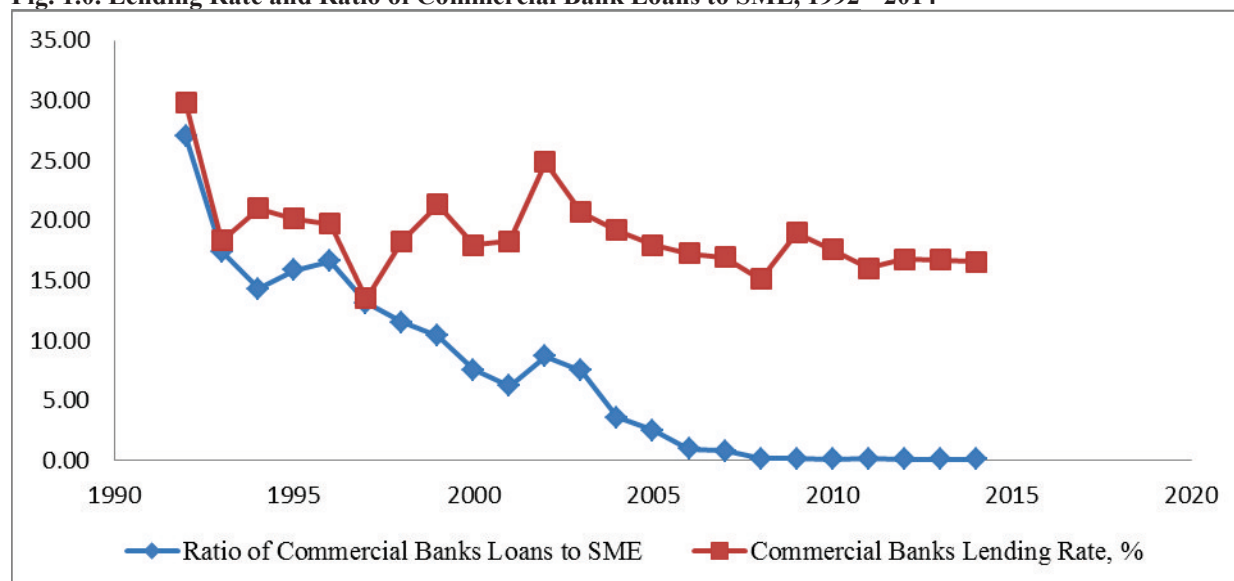
The huge financing gap in the MSME and SME sectors has to be filled, necessitating the presence and preeminence of Microfinance and other non-traditional banks in the financial sphere. Unfortunately, however, given the disproportionately high lending cost in the economy, microfinance and other non-traditional banks, in order to meet their loan demand, turn to commercial banks and other avenues to raise funds at an already high rate, directly transferring the costs to their customers, thus invariably reducing demand incentives for credit by Small and Medium sized firms.

However, considering the relatively low level of financial inclusion in Nigeria, the complementary role played by shadow banks cannot be over emphasized. This understanding of the importance of access to financial services in driving economic growth and reducing the level of poverty, especially in developing and emerging economies has engendered disparate government and private sector driven initiatives in not just increasing requisite access, but also improving them to serve those who otherwise would not have had the opportunity, thus creating an extensive savings depository, investible funds, capital accumulation and wealth creation, for the purpose of ultimately reducing poverty to a manageable level.

Despite the enthusiasm of those excluded to be included, lack of awareness, low income/poverty and proximity to financial centers constitute main barriers to increasing financial inclusion. It was this realization that led to the admonishment by (Kama and Adigun, 2013), to the effect, that all empowered institutions and government agencies in Nigeria need to continue to be creative in the ways shadow banks are incentivized in increasing financial inclusion

The Financial System Strategy 2020 (FSS2020) has financial inclusion as one of its cardinal objectives, an initiative demonstrating the level of commitment of the federal government to increasing stock of savings and citizens' empowerment in all spectra of the economy. Despite these efforts nevertheless, there is still much to be done, since financial inclusion or penetration remains very low, as such, shadow banks like the Microfinance Banks, Development Finance institutions, Primary Mortgage companies, etc should be given equal opportunities as the conventional banks by remunerating their deposits with deposit money banks. Access to public backstops should also be expanded to include shadow banks thus strengthening them to better serve the constituencies they are made to serve.

**Fig. 1.0. Lending Rate and Ratio of Commercial Bank Loans to SME, 1992 - 2014**



On the monetary policy end, over N3 trillion had been expended on banks bailouts by the Central Bank of Nigeria or its affiliates as at September 2009, including the N1.73 trillion expended by the Asset Management Corporation of Nigeria, buying non-performing assets of banks that were facing imminent collapse from the aftershock of the global financial crisis. Just a month earlier, the apex Bank had ploughed in N620 billion to rescue about ten banks in the heat of the crisis, only to be followed immediately with another N679 billion to recapitalize another three bridge banks. Unlike in developed countries, where bailout costs had been shouldered by taxpayers, as in the United States and Europe, the bailout costs in Nigeria were tripartitely shouldered by the Central Bank of Nigeria, Assets Management Corporation of Nigeria; and commercial banks. Between the trio, a sinking fund, called Banking Sector Resolution Fund was established, where each party contributes 0.3 percent of their total assets and additional ₦50 billion on an annual basis to the fund.

Being part of its developmental functions, the Central Bank announced the launch of Micro, Small and Medium Enterprises Development Fund (MSMDF), on August 15, 2013, specifically to assist micro, small and medium sized enterprises, with ₦220 billion naira in take off seed capital. Under this initiative, the Bank also set up the Commercial Agricultural Credit Scheme with ₦200 billion naira. There is another ₦600 billion, with ₦300 billion naira going to the Real Sector Support Facility and the remaining ₦300 billion naira earmarked for the Power and Airline Intervention Fund. This fund does not include the ₦213 billion established for the Nigerian Electricity Market Stabilization Facility. Overall, all these special interventions by the Bank do not fall directly under its mandate, neither do they belong within the conventional monetary policy tools arsenal. However, they are part of the broader instruments available to the Bank, towards achieving its statutory core mandates, and as such, are a wide-ranging chunk of shadow monetary policy and should be seen as such, for each of these policy actions affects the Bank's balance sheet and likewise the monetary aggregates.

Another of such fund, Commercial Agriculture Credit Scheme was created by the Central Bank in conjunction with the Federal Ministry of Agriculture and Water Resources in 2009, to provide financing for the country's agricultural value chain: production, processing, storage and marketing. The motivation behind this fund is the idea that increased production stemming from the intervention would help moderate inflationary pressures and assist the bank in achieving its price stability goal. The fund (CACS) is administered in two tranches of N100 billion each, with the first phase of the tranche running from May to December, 2009, while the 2nd tranche began in February, 2010 to date. The Bank continues with these intervention activities in a bid to complement the efforts of the fiscal authority in entrenching economic prosperity in the country.

## 2.2. Simplified Analytical Framework

Conventional shadow banks, as opposed to their informal sub-sector like cooperative and general thrift organizations typically operate like traditional or commercial banking sector, by borrowing short and lending long. Thus, their loanable funds come from similar sources as the commercial banks, i.e. owners' equity, household deposits, loans from commercial banks, etc. This process, according to Shin, (2010) and Singh, (2013) can be depicted as follows:

$$\sum_{j=1}^n \gamma_j = \sum_{j=1}^n \varepsilon_j \varphi_j (\tau - 1) + \sum_{j=1}^n \varepsilon_j + \mu \quad (1)$$

Where  $\gamma_j$  represents total maturity transformation by shadow bank $_j$ , the first term on the right hand side of the equation represents total funding to the private sector provided by shadow banks;  $\varepsilon_j$  is the total equity of shadow bank $_j$ , while  $\varphi_j$  is the fraction of shadow banks funding made by bank $_j$ , and  $\tau$  is the extent to which bank $_j$  is leveraged. The second term on the right hand side of the equation represents the total equity of the entire shadow banking system<sup>1</sup> and  $\mu$  is the stochastic term.

Since it is generally believed that a greater proportion of funding to the private sector by banks comes from household deposits and can be equated to money supply, M2, and is considered sticky in the short run (i.e. may not readily change), following this assumption, equation (1) can then be re-written as follows:

$$\sum_{j=1}^n \gamma_j = M2(\tau - 1) + \sum_{j=1}^n \varepsilon_j + \mu \quad (2)$$

Since the first term still denotes the funding funneled into the private sector by non-banks, and given that funding alone cannot by itself account for total money supply, the equation is then modified to reflect this reality by accounting only for the portion of the M2<sup>2</sup>, covered by the funding from non-banks, representing a departure from Singh (2013), in which the first term is assumed to account for the entire M2:

$$\sum_{j=1}^n \gamma_j = \omega_j \left( \frac{1}{n} M_2 \right) (\tau - 1) + \sum_{j=1}^n \varepsilon_j + \sum_{j=1}^n \delta_j + \mu \quad (3)$$

where  $\omega_j$  represents the fraction of contribution of bank $_i$  to the entire funding from non-banks,  $n$  denotes the total number of non-banks contributing to the funding, and  $\delta_j$  represents the Central Bank's unconventional interventional activities, proxied for shadow monetary policy, or, in case of the Central bank of Nigeria, its growth support programs.

Since it is a generally held notion that shadow banks in developing or emerging economies essentially complement the traditional banks, in particular serving populations typically marginalized in the mainstream commercial banking sector, the shadow bank's balance sheet, following general balance sheet equation, and in alignment with (Mazelis, 2015) can be represented as follows:

$$P_t Q_t = R_{t+1} D_{t+1} + E_t \quad (4)$$

The left hand side represents shadow banks portfolio  $Q_t$ , valued at  $P_t$ , and funded through the values on the right hand side, household deposits,  $D_{t+1}$  and shareholders' Net-worth,  $E_t$ , where  $R_{t+1}$  is the interest payments made out to depositors. However, since shadow banks in Nigeria typically don't pay interests on their depositors' funds, but charge interests on loans, potential shareholders' net worth can thus be represented as:

$$E_t = R_{k+1} P_t Q_t - [R_{t+1}]^\theta D_{t+1} = R_{(k+1)} [P_t Q_t] + E_{t-1} \quad (5)$$

$R_{k+1}$  is the interests income earned on funds,  $E_{t-1}$  represents owners' equity or seed fund, and  $R_{t+1}$  is the premium paid to depositors, where  $\theta$  equals zero.

### 3.0. Methodology

Given the dynamic and time dependent nature of the relevant data used in the model, we embraced the ARDL model's Bounds Testing approach to cointegration to examine the short and the long run associationship or level of cointegration among the underlying variables. The choice of this model is informed by the fact of its relevance. In conventional multivariate cointegration procedures, which are generally valid for large sample size, the bounds test approach within the ARDL is suitable for small sample size study. An added advantage of this

<sup>1</sup> The notation is not necessarily in conformation with accounting or any other regulatory convention, especially in regards to Basel III balance sheet rules.

<sup>2</sup> M2 here is considered to be equivalent of the customers' deposit, owners' equity and other funding sources of shadow banks and as such represents liabilities to shadow banks.  $\tau_i$  denotes weighted average cost of shadow bank $_i$ 's operation funding and is a function of its risk profile.

approach is the fact that it typically discounts the integration property of the series, in terms of whether a variable is an I(0), I(1) or is mutually cointegrated (Pesaran et al, 2001). This model has also proven to provide unbiased estimates of the long-run model and valid t-statistics (Harris and Sollis, 2003).

In order to examine the integration level as well as the possibility of co-integration among the variables, the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) Unit Root Tests were employed Dickey and Fuller (1981); Phillips and Perron (1988). The PP procedure computes a robust residual variance to auto-correlation, which was then subsequently applied to test for unit roots the same way as in the ADF unit root procedure.

This paper investigates the following questions: to what extent is the Nigerian shadow banking growth influenced by unconventional monetary policy, where growth is measured by deposits. It examines the relationship between the unconventional (shadow) monetary policy, vis-à-vis the average shadow banks lending rate, proxied by the maximum average lending rates by commercial banks. The commercial banks's average maximum lending rate is appropriate as the minimum lending rate for shadow banks in the country, plus applicable contingent premia, often driven by the prime lending rate (Awoyemi and Jabar, 2014). The prime lending rate is the interest rate that commercial banks charge on credits advanced to their prime borrowers, which include federal and state governments, large corporations and reputable civil organizations and government agencies. The prime lending rate also has a direct and positive relationship with the interest rates charged by commercial banks to small and medium sized enterprises, including the commercial banks' maximum lending rate, which is proxied for shadow banks's lending rate; as well as consumer loans and mortgage financing, etc.

Data covering the period 1992M1 to 2014M12 were used for the purpose of this analysis. Due to data constraints, we adopt microfinance banks, the finance companies and primary mortgage banks as model of the shadow banking sector, although information on these chosen sub-sectors before 1992 is minimal. In addition, the current microfinance banks are offshoots of the Peoples Banks, which came into existence in 1992, but metamorphosed into microfinance banks in 2006.

Monthly data on shadow banks average deposits (SBDEP), Loan to Deposit Ratio (LODEPRAT), Net Loans and Advances (NETLOAD), and Shadow Banks' Loan to Assets (SBLA); Shadow Bank's total deposit (SBDEP), proxied for shadow banking efficiency and estimations were done using EViews 9 software. The model for the study was selected because of its ability to capture all relevant term associations between the selected variables, thus helping us determine the real effects of changes in policy variables. While unconventional monetary policy is adopted as the link between shadow banking and shadow monetary policy, all other variables are averages of the relevant data from three shadow-banking sub-sectors, to wit: the microfinance banks, Mortgage Institutions and Finance Companies. The data were taken primarily from the 2014 Statistical Bulletin of the Central Bank of Nigeria and the "Other Financial Institutions" Department (OFISD) of the Bank.

### 3.1. Model Specification

Our adopted ARDL model attempts to estimate the following error correction model:

$$\begin{aligned} \Delta \ln SBDEP_t = & \alpha_0 + \sum_{k=1}^{n1} \alpha_1 \Delta \ln SBDEP_{t-k} + \sum_{k=1}^{n2} \alpha_2 \Delta \ln NETLOAD_{t-k} + \sum_{k=1}^{n3} \alpha_3 \Delta LODEPRAT_{t-k} \\ & + \sum_{k=1}^{n4} \alpha_4 \Delta \ln SBTA_{t-1} + \sum_{k=1}^{n5} \alpha_5 \Delta \ln SBLA_{t-1} + \sum_{k=1}^{n6} \alpha_6 \Delta \ln SBRESR_{t-1} + \sum_{k=1}^{n7} \alpha_7 \Delta SBLR_{t-1} + \sum_{k=1}^{n8} \alpha_8 \Delta \ln SMP \\ & + \beta_1 \ln SBDEP_{t-i} + \beta_2 \Delta \ln NETLOAD_{t-i} + \beta_3 LODEPRAT_{t-i} + \beta_4 \ln SBTA_{t-i} + \beta_5 \ln SBLA_{t-i} \\ & + \beta_6 SBRESR_{t-i} + \beta_7 SBLR_{t-i} + \beta_8 \ln SMP_{t-i} + \varepsilon_t \end{aligned} \quad (6)$$

$\Delta$  Represents the difference operator,  $\ln(\cdot)$  is the logarithm operator, while  $\alpha_0$  denotes the intercept;  $\beta_1 - \beta_8$  are long-run association coefficients, and  $\alpha_1 - \alpha_8$  are short-run dynamics of the model, while  $\varepsilon_t$  is the stochastic term or serially independent random error with mean zero and finite covariance matrix. Following the vector error Correction Model approach for causality test, if the F and t ratios for ECM are statistically significant, it implies that there exists bidirectional causation between the variables.

### 4.0 Analysis And Interpretation of Results

This section presents the results of the model estimated. Table 2 gives the ADF and PP unit root test results for the variables employed in the study. With the exception of the SBLA which seems to be stationary in ADF for intercept, an outcome that is not supported by PP test. This outcome implies that the second (PP) test should be

taken into consideration given that PP procedure computes a residual variance that is robust to auto-correlation and is generally used to test for unit roots as an alternative to ADF test, Jenkins and Katircioglu (2011). All variables appeared to be non-stationary at level but became stationary at their first difference, which implied that they are integrated of order one, I(1) alongside with SBDEP.

**Table 2. ADF And PP Tests for Unit Roots**

Statistics (Level)	LnSBDE P	La g	LnNETL OAD	La g	Lodeprat	La g	LnSBT A	La g	SBLA	Lag	LnSBRES R	La g	SBLR	La g	LnSMP	Lag
$\tau T(ADF)$	-1.15126	(0)	-1.5277	(0)	-2.2774	(0)	-1.2354	(0)	-2.92***	(12)	-2.1874	(0)	-2.9299	(0)	-0.8173	(0)
$\tau\mu(ADF)$	-2.5489	(0)	-3.0929	(0)	-3.0619	(0)	-2.3741	(0)	-2.9451	(12)	-2.1869	(0)	-2.8069	(0)	-2.3131	(0)
$\tau(ADF)$	-0.8720	(0)	1.3310	(0)	0.2871	(0)	2.1917	(0)	0.0387	(12)	-0.4689	(0)	-0.7632	(0)	1.9666	(0)
$\tau T(PP)$	-1.1498	(1)	1.5244	(2)	-2.2865	(2)	-1.2294	(6)	-4.1197	(5)	-2.2363	(3)	-3.0204	(4)	-0.7993	(5)
$\tau\mu(PP)$	-2.6101	(3)	-3.2049	(4)	-3.1814	(4)	-2.3734	(1)	-4.1315	(5)	-2.2553	(4)	-2.9155	(4)	-2.3131	(0)
$\tau(PP)$	0.8802	(2)	1.3435	(2)	0.2871	(0)	2.3114	(5)	0.0899	(0)	-0.4689	(0)	-0.7632	(0)	2.0655	(5)

Statistics (First Difference)	LnSBDE P	Lag	LnNETL OAD	Lag	Lodeprat	Lag	LnSBT A	Lag	SBLA	Lag	LnSBRES SR	Lag	SBLR	Lag	LnSMP	Lag
$\tau T(ADF)$	-16.61**	(0)	-16.63**	(0)	-16.54**	(0)	-16.83**	(0)	-8.84**	(11)	-16.52**	(0)	-16.50**	(0)	-16.80**	(0)
$\tau\mu(ADF)$	-16.58**	(0)	-16.62**	(0)	-16.53**	(0)	-16.82**	(0)	-8.81**	(11)	-16.47**	(0)	-16.51**	(0)	-16.77**	(0)
$\tau(ADF)$	-16.52**	(0)	-16.52**	(0)	-16.52**	(0)	-16.52**	(0)	-8.86**	(11)	-16.52**	(0)	-16.52**	(0)	-16.52**	(0)
$\tau T(PP)$	-16.61**	(2)	-16.64**	(2)	-16.54**	(1)	-16.85**	(5)	-16.49**	(0)	-16.49**	(0)	-16.50**	(0)	-16.81**	(5)
$\tau\mu(PP)$	-16.58**	(2)	-16.62**	(3)	-16.53**	(1)	-16.86**	(6)	-16.47**	(0)	-16.47**	(0)	-16.51**	(1)	-16.79**	(5)
$\tau(PP)$	-16.52**	(0)	-16.52	(0)	-16.52**	(0)	-16.52**	(0)	-16.52**	(0)	-16.52**	(0)	-16.52**	(0)	-16.52**	(0)

\*\* Denotes significance and rejection of the null hypothesis at 1%, 5% and 10% levels.  $\tau T$  represents a general model with intercept;  $\tau\mu$  represents model with intercept and trend, while  $\tau$  represents the most restricted model without intercept or trend. All series are processed in their natural logarithm except those that are in percentage terms. Numbers in brackets are lag lengths used for ADF test as determined by SIC set at maximum of 15 to extricate serial correlations in the residuals. With PP test, numbers in brackets represent Newey-West Bandwith (as determined by Bartlett-Kernel). Both the Augmented Dickey-Fuller and Phillip-Peron tests were conducted, following (Jenkins and Katircioglu, 2011) and in accordance with (Enders and Granger, 1998), with unit roots test performed with intercept only, intercept and trend and without intercept and trend. Tests were carried out with the aid of E-Views 9.

Having established that our variables are stationary at their first difference, we proceed to investigate any short-run dynamic association-ship and long run relationship among the relevant variables (SBDEP, LODEPRAT, NETLOAD, SBLA, SBTA, SBRESR, SBLR and SMP). The results of the bounds test for cointegration between the variables are shown in Table 3. Evidence from the table indicates that we cannot reject the null hypothesis of no cointegration, meaning a long-run relationship between Shadow banks' deposits, loan to deposits, net loans to assets; shadow banks total assets, shadow banks' lending rate and monetary policy do not exist. From the table, the computed F statistics of 1.378 is less than 3.50 of upper bound critical value at 5% level of significance. The critical values for the bound test were automatically estimated in EVIEWS 9, but can also be obtained from Pesaran et al 2001 Table CI (IV).

**Table 3: Bounds Test for Cointegration**

Test Statistics	Value	Significant level	Bound critical value (unrestricted intercept and trend)
<b>F-statistics</b>	<b>1.377990</b>		I(0)
		10%	2.03
		5%	2.32
		2.5%	2.68
		1%	2.96

**The Results of the Long Run Model**

Estimates from Table 4 show that loan-to-deposit ratio and net-loan-and-advances are negatively signed, indicating insignificant negative impacts on shadow banks' deposits, meaning that the degree of long term association-ship is negative and negligible. Other variables exhibited a positive impact but also statistically not significant, except shadow monetary policy, which exhibited a positive impact on shadow banks' deposits and also significant at 5% level.

Following Narayan and Smyth (2008) and Odhiambo (2009), we estimated the short-run dynamic variables through error correction model associated with the long-run estimates. The long run relationship between the variables, however, failed to indicate any causal relationship between any of the variables and in any

direction. What we found was the lack of short-run causality running from shadow monetary policy to shadow banks' deposits stock, indicating a disconnect between the Central Bank of Nigeria and the informal banks' growth. The significance of the result is confirmed by the F-statistic and the lagged error-correction term. The short-run causality is characterized by the F-statistic on the causative variables, while the t-statistic of the lagged error-correction term characterizes the long-run causal relationship, Narayan and Smyth (2008); Odhiambo (2009).

**Table 4: The Results of Long-Run Coefficients**

Variables	Coefficient	t- statistics	P value
C	-69.0492	-1.3647	0.1735
LODEPRAT	-0.0047	0.0174	0.7876
LnNETLOAD	-6.0990	-1.0944	0.2748
LnSBLA	75.0386	1.2402	0.2160
LnSBTA	5.3450	1.1460	0.2528
LnSBRESR	0.1274	1.1299	0.2596
SBLR	0.0492	1.1722	0.2422
LnSMP	0.7835	2.4343***	0.0156***

**Table 5: Error-Correction Model**

Variable	Coefficient	t-statistic	Probability
D(LODEPRAT)	-0.0048	-1.5371	0.1255
D(NETLOAD)	-0.6305	-0.7040	0.4821
D(SBRESR)	-0.0822	-3.5329	0.0005***
D(SBTA)	1.2100	1.6412	0.1020
D(SBLA)	11.4455	1.1968	0.2325
D(SBLR)	-0.0264	-3.5507	0.0005***
D(SMP)	0.5324	6.8496	0.0000***
<b>ECT(-1)</b>	<b>-0.0564</b>	<b>-3.2028</b>	<b>0.0015***</b>
R Squared	0.99		
F Statistics	2299.33		0.0000
LM Test	0.17		0.9185
DW Statistics	1.97		

\*\*\* 5% level of significance. ARDL (1,0,1,1,1,1,1) Automatic lag structure selection based on AIC

**Table 6: Results of Diagnostic Tests**

Test	Chi-Square ( $\chi^2$ ) Statistics	Probability
Breusch-Godfrey Serial Correlation LM	1.82	0.40
Heteroskedasticity	117.45	0.00
Jarque-Bera normality test	0.13	0.94

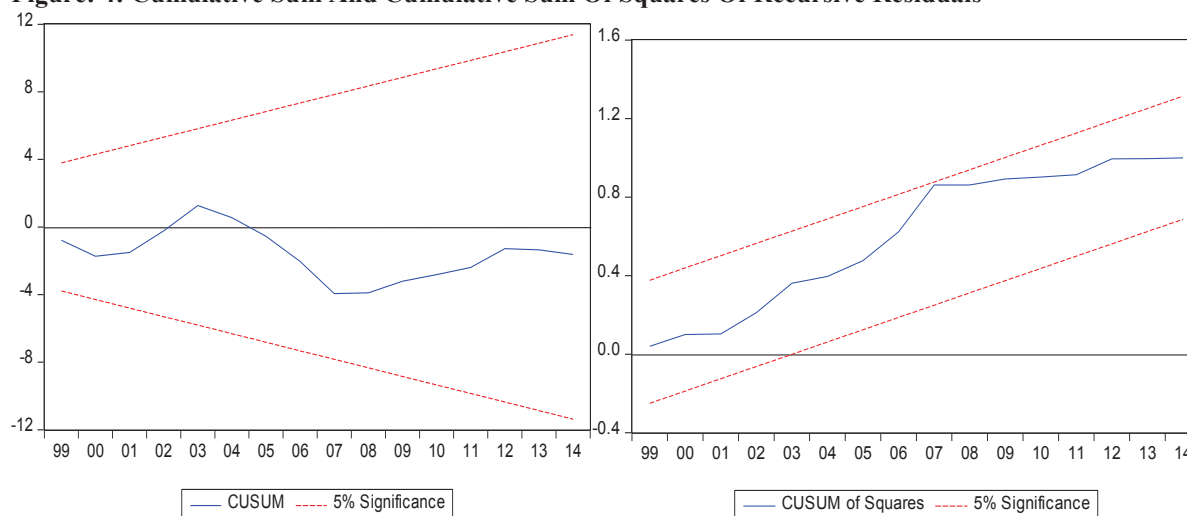
The Error Correction Model (ECM) validated an existence of a long run relationship between our dependent variable (SBDEP) and shadow monetary policy but the results also found no such relationship among other remaining variables, vis-à-vis shadow banking sector growth. The fact that the R square is less than the DW confirmed that our Error Correction Model is not a spurious model.

The outcome of the short run dynamics associated with the long run association-ships are presented in Table 5. Starting with the long run, the lagged error-correction term coefficient is significant at 5% level with the expected negative sign, and accordingly attests to the result received from the bounds test for cointegration. The ECT coefficient of -0.056 implies the speed of adjustment back to equilibrium after a shock. Essentially, about 5.6% of disruptions in the shadow banking sector from the previous month adjusts back towards long run equilibrium in the subsequent month, or approximately 67% of such disruptions in the previous year converges towards equilibrium in the current year, which demonstrates a significant level of resilience in the shadow banking sector.

The regression for the ARDL equation (6) fits very well with  $R^2 = 99\%$  and passes the diagnostic tests for residuals' normal distribution and against serial correlation. However, it failed the heteroscedasticity test at 5%, nevertheless, the time series forming the ARDL equation are of mixed order of integration,  $I(0)$  and  $I(1)$ , such a detection of heteroscedasticity should not be a significant cause for concern as such outcome is natural (Oteng-Abayie and Frimpong, 2006). The results did not indicate any instability in the coefficients, given that both the cumulative sum (CUSUM) and cumulative sum of squares (CUSUMQ) plots fall within the critical bands of the confidence level of parameter stability, (Fig. 4)



**Figure 4: Cumulative Sum And Cumulative Sum Of Squares Of Recursive Residuals**



### 5.0 Conclusion

The study found that composition of shadow banking differs from country to country. In some jurisdictions, shadow banks are subject to almost the same level of regulation as conventional banks, while in others, the level of oversight is more relaxed. In developing and emerging economies like Nigeria, shadow banks are archetypal in the fight against poverty and empowerment of the rural and semi-urban populace, thus, a potent tool for financial inclusion.

Whereas, shadow banking in Nigeria is tightly regulated, mostly by the Central Bank of Nigeria, we found that such regulation is not at the policy level but rather through administrative controls. This was more obvious from the insignificant short-run positive relationship between shadow monetary policy of the Central bank and the shadow banks at large. This study found little or no evidence of a relationship between shadow monetary policy and the shadow banks, primarily because the standard condition for such is non-existent. As such, since Nigeria is nowhere near the zero-lower bound (ZLB) of interest rates, there is no other evidence to prove the existence of shadow monetary policy in the country, safe for intervention bailout and creation of bridge banks in order to consolidate the banking industry. Nevertheless, the Nigerian monetary authority is active in developmental finance, propping up local industries in efforts to make them competitive globally, hence reducing dependence on imports in those areas where the country has comparative cost advantage. This is done in order to reduce pressure on the local currency and boost exports.

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