BANKS DEPOSIT MIX AND FINANCIAL SUSTAINABILITY OF NIGERIAN BANKING INSTITUTIONS: A PRE AND POST GLOBAL FINANCIAL CRISES OUTLOOK

ONUORAH, ANASTASIA . C. (Ph.D.)
DELTA STATE UNIVERSITY, ABRAKA, ASABA CAMPUS, FACULTY OF MANAGEMENT SCIENCES
DEPARTMENT OF ACCOUNTING, BANKING AND FINANCE
Corresponding Author: Email anastasiaonuorah1@gmail.com

OZURUMBA. BENEDICT. A. (Ph.D.)
DEPARTMENT OF FINANCIAL MANAGEMENT TECHNOLOGY, SCHOOL OF MANAGEMENT
TECHNOLOGY, FEDERAL UNIVERSITY OF TECHNOLOGY OWERRI,
OWERRI IMO STATES, NIGERIA. ozurumbabenedict@gmail.com

OJIAKU, ETELBERT. U (Ph.D.)
ACCOUNTANT GENERAL'S OFFICE, OWERRI, IMO STATE.
ojiakueu@yahoo.com

Abstract

Bank deposit mix is instrumental in the determination of bank profitability, size, and financial sustainability as a result deposits play a requisite role in the achievement of bank profitability objectives through her financial intermediation role. This paper empirically examined the comparison of bank deposits mix and its effect on bank financial sustainability in Nigeria. Secondary data obtained from CBN, 2018 was used to estimate the model based on the unit root test and vector autoregressive model using E-Views version 9.0. The result confirms that Time Deposit Rate impacted negatively on Loan to Deposit Rate, Inflation Rate, and Interest Rate Spread. Demand Deposit Rate affects Loan to Deposit Rate and Inflation Rate negatively except Interest rate spread is positively related. Foreign Currency Deposit Rate impacted on the dependent variable and the control variables (i.e. inflation and interest rates) positively. Demand Deposit Rate is significant to Inflation Rate and Interest Rate Spread. Foreign Currency Deposit Rate is significant to Loan to Deposit Rate and Interest Rate Spread. Time Deposit Rate has a significant relationship with the inflation rate. In the lagged year, Loan to Deposit Rate is significant with the control variables. This implies a short-run effect of banks deposit mix measures on Demand Deposit Rate, Time Deposit Rate, and Foreign Currency Deposit Rate on Loan to Deposit Rate, Inflation Rate, and the Interest Rate Spread. The control variable in the form of Interest Rate Spread has the highest correlation with bank deposit variables and is explained by 68.5%. The paper recommends that the Nigeria Monetary policy committee should devise suitable

control variables impacting the rates of bank deposits in Nigeria. The volume of deposit to total rural branches should be improved to create effective Loan to Deposit Rate for bank financial sustainability in Nigeria.

Keywords: Bank, Deposit Mix, Financial Sustainability, Banking Institutions, Global Financial Crisis;

1. INTRODUCTION

Deposits occupy a foremost position in a conventional balance sheet of a bank. The bank deposit mix is instrumental in the determination of bank profitability, size, and financial sustainability. This is based on the fact that deposits play a requisite role in the achievement of bank profitability objectives through her financial intermediation role. In another direction, the Nigerian banking industry via her financial intermediation role-plays a fundamental role in the nation's economic growth and development. Also, the effect of deposit on bank profitability and financial sustainability cannot be over-emphasized in a hurry. Indeed, all bank business activities revolve around fund mobilization and credit advancement to its customers. Consequently, resulting from its primary reason for existence, banks ensure that it effectively and efficiently maximizing profit and ensuring that loss arising from its activities as well as economic vagaries is minimized to the barest minimum.

Tobira and Ogbulu (2014) submitted that, Nigerian banks are authorized by the law to function as financial intermediaries in order to meet the financial needs of individuals at all income levels and geographical locations adequately in a timely, modest, conservative, legal, human-centric manner, and such services must be at minimal cost within the ambit of the law. Hence, if the Nigerian economy must attain sustained growth, the Nigerian banking industry must perform its financial intermediary role efficiently, effectively, optimally and creditably. They added that, given the symbiotic relationship among national savings, national investment and national growth, it is therefore highly imperious for the Nigerian banking

industry to perform their financial intermediation role adequately, credibly, and optimally. However, in reality, the level of growth of a country is not dependent on the financial intermediation roles played by banks alone, instead, it also depends on the macro-economic fundamentals in place in such a country. Examples of such macro-economic fundamentals include interest rate stability, good banking attitude, increased national savings, and investment (Ogbulu, Uruakpa, & Umezinwa, 2015). They also pointed that, leaving interest rates to be determined to market forces of demand and supply alone will not lead to increased deposit mobilization; there is the need for the government at all levels to encourage increased aggregate savings and investment and at the same time adopt a contractionary policy concerning the national expenditure.

From the empirical point of view, a series of empirical studies on the subject matter abound in both developed and developing economies of which Nigeria is no exception. However, none of them have been able to empirically disaggregate various bank deposits mix with bank financial sustainability instead studies on the subject matter have focused on the effect of deposit liabilities on bank profitability. This constitutes a conceivable gap in the literature which this study seeks to fill. In the same vein, researches on bank deposit mix and its profitability nexus present two (2) fold policy directions. Based on this reasoning, researchers submitted that bank deposit mix proxies have a convex (linear) effect on the banking industry's financial sustainability while some reported a concave (inverse) relationship. Given the above, there is still an endless debate among researchers as to

the model and degree of the relationship between deposit mix and aggregate bank performance. This study seeks to empirically compare the different bank deposits mix to determine its effect on bank financial sustainability. Specifically, the study seeks to determine the implication of aggregate savings deposit rate, demand deposit rate, fixed deposit account rate, foreign currency deposit rate and aggregate volume of deposit on the Nigerian banking industry's financial sustainability as captured using Loan to Deposit Ratio (LDR), affect the Nigerian banking industry's financial sustainability than other deposit mixes. The study also considers the causal relationship between employed variables using the granger causality estimation technique, while implying the hypotheses.

This study will be of immense benefit to government at all levels and help improve their policy-making and taking processes. The research will also widens the knowledge of banks as regards the impact of deposit mix on bank profitability. The study will also inform financial regulatory on their take on the directional relationship between deposit mix and bank performance and by extension economic growth and assist researchers with recent, useful, timely, and handy information on the subject matter, which will enable them add to knowledge and widen the horizon of the general public as well as change their banking attitude on the directional relationship between deposit mix and bank performance and by extension economic growth.

The remaining segments of the paper are organized in the following sequence. The second part deals extensively with the literature review. The third segment focuses on the research methodology. The fourth segment analyzes the result and discussion. The last segment delves into the conclusions and recommendations.

2.1   LITERATURE REVIEW

This section focuses on past conceptual, theoretical and empirical studies on the subject matter.

2.1.1   Conceptual Exposition on Deposit Mix

Commercial banks offer a wide range of deposit schemes to the general public irrespective of their financial status quo. In other words, the bank deposit mix represents the various platforms and tactics banks use to instill in the banking public investment attitude as well as mobilize deposit funds and savings. In otherwise, the deposit mix constitutes the combination of various forms of deposits (current deposits, savings deposits, and term deposits) and their share in a total deposit. It is the medium through which bank bridges the functional gap between its profitability objective and liquidity objective. Indeed all banking business activities revolve around the deposit.

According to Muriu (2011), bank deposit mix ranges between savings deposit account, demand deposit accounts otherwise known as current deposit accounts, time deposit account, fixed deposit account, to domiciliary accounts. In order to increase economic investment base and give equal opportunity to individuals at all income levels, banks open account to lower-income earners to instill in them investment attitude on the request of the customer;Consequently, current (demand) deposits are meant for government workers, corporate firms, institutions, and businessmen whereas savings deposits are designed for low-income individuals. Fixed deposits are designed mainly for the household segment and institutions. Savings deposit accounts holders usually use bank deposit form to pay in cash into their account and use withdrawal slips or other cash withdrawal terminal to withdraw or transfer money from their accounts. Based on the credit policy obtainable in the bank and the creditworthiness of the bank customer, holders of demand deposit account, unlike savings deposit account, have access to credit facilities. Banks monthly charge them a monthly commission on turnover (COT) depending on the number of transactions they made on the bank. Deposit rates on

this account are usually higher than the savings deposit account. Banks also help individuals to keep their idle funds depending on when they need such funds usually at the expiration of the said period (6 months, 1 year, 1 year and 6 months, etc.). Usually, this form of deposit falls within re-investment deposits, recurring deposits, double benefit deposits, short deposits, fixed deposits, monthly income certificate, quarterly income, certificate, cumulative deposit and the like. Fixed deposits are interest-bearing deposits available for both short and long maturity periods. Bank pay deposit interest rate depending on the principal sum of deposit and maturity period. Deposits under the arrangements are highly liquid and the loan facility against these deposits is also available. Banks, in turn, uses these funds to invest in assets that are interest-bearing from which they use in paying both the principal amount and the interest that is attached to it. Lastly, they also keep in their custody account which are dominated in foreign currencies usually dollars. It is operated like the current account.

From a global outlook, ECB (2009) reported that the bank deposit mix is based on the bank structure (source and use) of funding stated in the bank balance sheet. The balance sheet of the bank is strengthened via deposit withdrawals. This concept relies on the deposit and efficiency of the banking system (ECB, 2009). Although there is a shift of government market share to corporate firms during the last two decades, the bank deposit mix remains constant even during the financial liberalization era reaffirming the importance of fixed deposits.

Furthermore, the deposit mix plays a pivotal role in determining bank profitability, financial sustainability, and it is paramount for asset composition. Mahinda, Jacob, and Michele (2017) suggested that bank profitability has a direct effect on bank efficiency which in turn attracts much deposit and instills public confidence in the system. Hence, the higher the level of bank profit, the better and higher the level of

deposit. Succinctly, the doggedness, sustainability, and level of deposit of the Nigerian banking industry depend on its profitability. Consequently, both current and prospective bank customers look for a resilient banking industry that could stand the vagaries posed by economic fundamentals and the nature of branch networking. In the same vein, Bouwman (2013) submitted that in a situation whereby all banks deposit liabilities are in the form of cash and such those not generated profit the banks may as well turn the deposit fund into lending. Therefore, banks have to adjust its asset structure and liabilities on the balance sheet for it to achieve better performance. He added that banks can turn their liquidity objective to profitability in a bid to strike a balance between liquidity and profitability. In the same vein, banks can keep a large percentage of cash equivalents and accumulate more fixed deposits to hold a relatively smaller percentage of cash. Banks may as well modify some items in their balance sheet that may as well increase their deposit funding. Additionally, they may as well alter the structure of the asset side of the statement of financial position and then endure the reduction in default risk and the increase in the cash equivalents. However, some banks' assets and liabilities structures cannot resist instability since they use costly liabilities. The structure of funding and liabilities is very paramount for these banks (Bouwman, 2013).

Chikem (2018) pointed out that, the ability of management and employees of banks to attract deposits and attain public confidence in the system is dependent on its deposit mix and fluctuation. Deposit mix and fluctuation affect bank portfolio strategy, bank financial decision on cash generation and accumulation (cash reserve), bank-asset-mix, income distribution, bank efficiency, bank liquidity, customers' patronage. However, due to the current decline in the bank deposit base coupled with the sophisticated demands of bank customers, the bank now focuses on non-deposit media such as investment in money market instruments. He added that the

deposit mix is dependent on bank liquidity, the security of the bank, increased branch network, interest charged on deposit and lending rate, state of the economy, and stability of the financial system**.**

2.1.3 Conceptual Exposition on Financial Sustainability

Researchers have not come to a compromise on the definition of financial suitability which has giving rise to different perspectives or schools of thought. Broadly speaking, sustainability involves putting in place appropriate measures, systems, and program that will aid banks to render services to her customers continuously wherein the customer continue to benefit from these services consistently and continuously. This may also mean that the activities, programs, and services that the bank renders to her clients are satisfying given that banks may either decide to raise funds internally or externally. However, it's financial or resource implication may not be understood instantly since it has prospects undertone. Muriu (2011) defines financial system sustainability as the ability of banks as well as microfinance institutions to meet all its current costs (operating costs, financial costs taking into account macro-economic vagaries and the costs expended on growth should she wants to expand her operations.

Mwangi, Muturi, and Ombuki (2015) summarized the definition of Sharma and Nepal (1997), & Shah (1999) on financial sustainability into bankers' approach and unified approach. Sharma and Nepal (1997), argued objectively that, a financial institution is said to have attained financial sustainability when the operating income generated from the advancement of credit facilities to its clients adequately covers all associated operating costs. This viewpoint supports the bankers' approach to the construct and holds onto the accounting ideology of sustainability. However, Shah (1999) adopted a more realistic and comprehensive approach' in defining the construct as

the 'accounting approach' to sustainability since those not take into account other factors other than finance. Shah (1999) believes that the concept of sustainability should include amongst other criteria, - fund procurement at market rate and deployment of local resources. Hence, his performance appraisal and evaluation criteria for the financial viability and doggedness of any bank as well as other related financial institution should include amongst others: firm repayment rate (FRR), market interest rates (MIR), operating cost ratio (OCR), worth of the portfolio (WOP), and 'demand-driven' village credit system (DDVCS) in which indigent farmers themselves seek for the loans to finance their project.

From a banker's approach, financial sustainability should include both financial feasibility and the self-sufficiency of either its banking or non-banking financial institutions (Sharma and Nepal, 1997). This signpost that this viewpoint focuses more on financial, administrative and institution than focusing on smaller segments of the economy (farmers) which are also involved in deposit mix. Hence, this study adopts a more holistic and comprehensive definition of financial sustainability as defined by Mwangi, Muturi, and Ombuki (2015). According to Mwangi, Muturi, and Ombuki (2015), financial sustainability involves instituting appropriate measures, systems, program as well as product development, and customer-centric service delivery system by lending institution that is geared towards rendering services to her customers on a continuous basis wherein the customer continue to benefit from these services consistently and continuously at prices that cover all cost associated with these financial services without external subventions and assistance.

2.1.4. Conceptual Perspective of Deposit Mix and Financial Sustainability

The conceptual perspective of this work posits that deposit mix helps to improve and sustain the Nigerian banking industry given that her deposit program is

cost-efficient and effective in that its current financial, operational as well as expansion expenses does not outwit income internally generated via deposits mobilization and accumulation since external source of financing may be expensive comparatively. The conceptual model for this study is diagrammatically represented below:
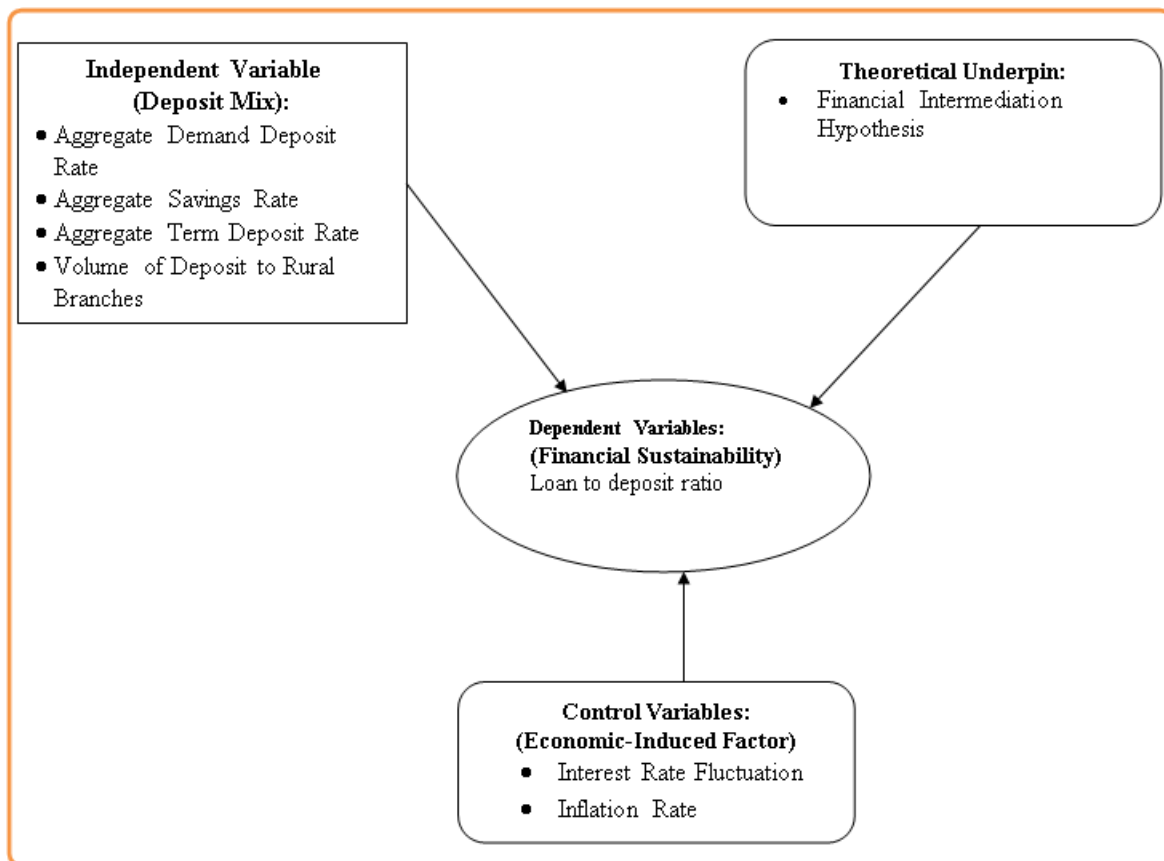

Fig. 2.1: Relationship between Deposit mix and Financial Sustainability
Source: Researcher's Conceptual Model, 2019

2.2. Theoretical Concept

The theoretical concept of this study is anchored on the financial intermediation theory (FIT), loanable fund theory (LFT), and institutionalist theory (INT).

The first theory which buttresses this study is the FIT. FIT is built around the premise that banks serve as a financial intermediary to reduce transaction costs arising information disproportionateness. With the current sophisticated information technology, financial deregulation, financial market doggedness, reduction in transaction cost, and information disproportionateness between different individuals in the economy, the need for financial intermediation hypothesis becomes germane. Also, exponents of this theory are of the strong assertion that the major function of banks is to bridge the financial gap that exists between savers and borrowers through deposit

mix strategy which in turn has a direct effect on financial sustainability.

The second theory which buttresses this study is the loanable fund theory (LFT).The LFT was framed by Prof. Dennis Robertson and Prof. Bertil Ohlin. LFT considers market forces of demand as supply. The major crux of this theory is that the interest rate determines the demand for and supply of loanable funds in the capital market using classical market analysis. Proponents of this theory hold that both firms and individual investors who desire to save supply loanable funds to borrowers (entrepreneurs and investors) while both entrepreneurs and investors who desire to demand loanable funds from lenders (firms and individual investors). Economic agents at the loanable market make negotiations based on the prevailing market rate. Hence, the market rate is determined where the supply of and the demand for loanable funds is equal. This connotes that the loanable funds market depends on the tenet of equilibrium. At equilibrium, both the surplus economic units and capital providers are the happiest possible and the interest rate spread should not too dispersed so that either of the parties should not think that he is cheated. This is because, as the interest rate on credit facilities increases, external becomes more expensive while the demand for the loanable fund will move in the opposite direction (i.e. decreases). On the other hand, as the market interest rate on savings reduces, the supply of loanable funds reduces as well because when the interest rate is low, it discourages net savers.

The last theory which buttresses this study is the institutionalist theory of financial sustainability. Meyer (2002); Morduch (2000), Woller,; Dunford, &Woodworth, (1999) Woller, G (2004) exponents of institutionalist theory of financial sustainability focuses and gives credence on self-sufficiency of the lending institution which may necessitate it to deliver appropriate service to the rural dwellers in a more convenient and sustainable manner. This is premised on the presupposition that, unless the lending institution can provide financial services independent of external borrowings as well as cover all related costs (operating and financing costs), it will not be able to meet the needs of the poor masses in the long run.

2.3. Empirical Studies

This section reviews empirical studies on the subject matter in a bid to discover the missing link in the existing body of knowledge as well as add to the existing body of knowledge.

Recently, Girma and Jiqin (2018), using balanced panel data of 166 observations for rural cooperative societies situated in Ethiopia from 2014–2016, explored how deposit mobilization affects their financial sustainability. The revealed that deposit liabilities to loan ratio, the volume of deposits, deposit liabilities to total asset ratio, and demand deposit ratio had a significant and positive impact on financial sustainability. However, interest rate spread (IRS) showed that a negative on financial sustainability. Furthermore, the institution's age and inflation rate have a direct effect on financial sustainability. Contrarily, the number of members and the ratio of woman members were insignificant. This may be credited to the fact that some members were passive for a very long time. Conclusively, rural cooperative societies should focus more on deposit mobilization especially on current deposits and must ensure that they keep the IRS lower to ensure their financial sustainability.

Ruochen and Xuan (2015) investigated the factors which affect the profitability banks in the US from 2002-2014 using different bank size. The dependent variable for the study was profitability proxied by return on assets (ROA) and return on equity (ROE) while the independent variable is determinants proxied by loans to total assets ratio, customer deposit ratio, efficiency, and revenue diversification, Non-performing loans ratio. They discovered among others that find that banks have experienced low profitability

when they have: high loans to total assets ratio, high customer deposits ratio, a high non-performing loan ratio, lower efficiency, and lower revenue diversification. This depicts that bank profitability (ROA and ROE) have an inverse relationship with loans to total assets ratio, customer deposit ratio, non-performing loans ratio and direct relationship with efficiency, capitalization, and revenue diversification. A possible reason is that commercial banks offer high lending interest rates to attract more deposit funds, degrade the bank's profitability level. Also, with the constant rise in nonperforming loans, commercial banks have to set aside extra funds to cover future loan losses, and thus degrade the bank's profitability level. Conversely, the more revenue-diversified banks are the more profitability since risk diversification is an effective way of canceling unsystematic risk. Finally, they also found that the relationship between different variables and bank profitability measures differs due to different size of banks with a different sample period

Menicucci & Paolucci(2016) examine the relationship between bank-specific variables and profitability in the European banking sector covering 175 firm observations from 2009-2013. The data for the study were gotten from Bank-scope and a wide-ranging set of internal characteristics is examined. Findings suggest that all the determinant proxies used in the study have a statistically significant effect on the profitability of European banks. However, the effects are not even across profitability proxies. Regression findings reveal that bank size and capital ratio are significant company-specific determinants of bank profitability in Europe, while lower loan loss provisions result in high profitability levels. Findings also suggest that banks with lower deposits and loan ratios tend to be less profitable but the effect on profitability tends to be statistically insignificant in some situations. This implies that the study has sizeable policy implications, as the performance of the European banking sector relies heavily on its operational efficiency, profitability, survival, and competitiveness. Given these findings, some suggestions may be functional for bank regulatory authorities to intensify and sustain the robustness and stability of the banking sector.

Mahshid (2016) examined the extent to which loan fluctuation affects deposit funding. Using loan fluctuation proxied by the standard deviation of the loan, and conditional fluctuation of the bank's loan volumes forecasted by a GARCH as the dependent variable and deposit ratio, uncertainty, inflation, and capital structure, ROA as the independent variable. The spanned through 14 years (i.e. 2000 to 2013). Using a unique dataset of the Iranian banking system and the dynamic panel data, it was found that loan fluctuations have a statistically significant effect on the deposits mix. Banks respond to loan volatility mainly by altering their deposits volumes. Accordingly, loan fluctuation has inverse effects on deposit ratio in the Iranian banking system. Also, capital structure, ROA, and non-serviced loans affect the bank deposit mix.

A study was done by Narayana, Suman, & Ashok(2015)to compare and contrast Deposit Mobilization (demand deposit, savings deposit, and term deposit) of Commercial Banks in BOB and Axis Bank in Bhubaneswar City. The study employed annual time series data spanning through 2008 to 2009 and 2013 to 2014 gotten from the RBI bulletin. The study used the primary source of data via a structured questionnaire to present the different factors affecting the level of deposit of BOB and Axis Bank in Bhubaneswar city. Analysis of data was done using descriptive statistics. On a general outlook, the result revealed that Bank of Baroda in Bhubaneswar city performed much better than Axis bank in terms of deposit mobilization. However, Bhubaneswar banks experienced a significant deterioration in terms of demand deposits in the year under study. In synopsis, both BOB and Axis Bank experienced a significant

increase in terms of current deposit trends but current deposits growth rate fluctuates every year.

Dacan (2012) studied the causal relationship between bank deposit base and bank profitability in Kenya. Using a casual-research design, the study population covers 44 commercial banks from 2004-2011. The researcher found that the bank deposit base is a major determinant of bank profitability.

The study of Mwangi, Muturi, and Ombuki (2015) was based on the effect of deposit to asset ratio (DAR) on the financial sustainability of deposit mobilization of nine microfinance banks in Kenya using ratio analysis. Data were gathered from the Central bank of Kenya covering 2012 to 2013. The study adopted the cross-sectional data to draw a tentative conclusion on the study using statistical package for social sciences. The result showed that DAR has contributed significantly to the determination of the financial sustainability of micro-finance intuitions in Kenya with a tolerant value of 2.374 and a probability value of 0.0005. The policy implication of the study is that all MFIs should be quoted in the GEM segment of the stock markets to attain financial sustainability. In the same vein, Muriu (2011) found a direct and significant relationship between DAR and MFI sustainability. He argued that a larger proportion deposit base in relation to aggregate liabilities will result in an overall lower cost of funds for the MFIs which may, in turn, bring about enhanced profitability and consequently financial sustainability ―given that the deposits program is cost-effective and efficient. His findings were in tandem with Cull, Demirg¨uc-Kunt, and Morduch (2011), that MFIs should, therefore, widen their services toward offering targeted deposit mobilization. This is paramount as it would also expand the MFIs' lending capacity. However, these contradict the findings of García-Herrero, (2009) who finds insignificant results between DAR and MFIs sustainability in the Chinese banking industry. However, Bogan (2009) found an inverse relationship between DAR and financial sustainability. This could

have been attributed to little or no knowledge and experience in deposit mobilization strategy and the high costs that are concerned with deposit transformation.

GulIrshad and Zaman (2011) in a separate study on the determining factors which affect bank profitability focused on the first 15 banks in Pakistan from 2005-2009. They discovered among others that, the bank deposit base has a direct effect on ROA and has an adverse effect on ROCE. Similarly, the ratio of aggregate deposit liability to bank asset has an adverse on ROCE, which depict that banks which focuses more on customers deposit funds are less profitable.

Literature Critics/Gaps in the existing body of Knowledge

A close look at the various econometric reviewed above presented the following gaps. Firstly, to the researchers' best of knowledge, no empirical study has dealt with the possible effect of deposit mix on the financial sustainability in Nigeria as well as other countries. Little is known, however, about whether the bank deposit mix can achieve the financial sustainability of banks in Nigeria.

Secondly, this paper tries to link savings deposits, demand deposits, fixed deposits, and domiciliary account to financial sustainability. Thirdly, a close look at the various econometric reviewed above revealed that work on the subject matter has not been able to disaggregate bank deposit in relation to bank profitability. However, these study results provide interesting insights into the various bank deposit mix in relation to its effect on the profitable banks in Nigeria.

Secondly, few econometric studies have empirically explored the effect of deposit mix on bank profitability in Nigeria so far, even though similar studies have been conducted in several developed countries but were unable to disaggregate the various forms of deposit in relation to bank profitability.

Therefore, this current paper tries to close a paramount gap in the extant literature improving the understanding of bank profitability in Nigeria.

Thirdly, unlike prior empirical studies, we did not use the return on asset (ROA) as a proxy for aggregate bank sustainability to observe the effect of deposit mix on bank sustainability. This is because ROA examines sustainability regardless of the institutions' funding structure. Instead, we use the ratio of bank deposit to GDP as a measure of bank sustainability. Finally, we also added the interest rate spread (IRS) as a key factor at the institutional level. This is because the interest and inflation rates to control the relationship deposit mix and bank sustainability.

3. METHODOLOGY

This study utilized the ex-post facto research design otherwise known as the causal relationship research design in a bid to investigate the effect of deposit mix on financial sustainability in Nigeria Deposit Banks. All Banks regulated by the Central Bank of Nigeria (CBN) and quoted in the Nigerian Stock Exchange formed the study population for this study. The study utilized a population sampling technique where the twenty-one commercial banks as a whole were studied. This technique was highly dependable since all the commercial banks in Nigeria mobilize deposits funds; hence, the study adopted the population sampling technique since all the twenty-one commercial banks were studied. The study also utilized a secondary source of data with the aid of the archival retrieval method being used to gather the necessary data. The data set was obtained from the Central Bank of Nigeria statistical bulletin, 2017. The data spanned from 2001-2017 covering the pre- and post-global financial crises era of 2008. The data analysis was done using the panel data regression estimation (PDRE), generalized methods moments (GMM), GMM estimation technique utilized in panel estimation which consideration the consistent and persistent trends of the explained variable over time. The model for the study is explicitly presented thus:

$$LDR_t = \alpha_O + \alpha_1 DDR_t + \alpha_2 TDR_t + \alpha3 FDR + \alpha_4 VDR_t + \alpha_5 INF_t + \alpha_6 IRS_t + \mu \ldots\ldots\ldots\ldots\ldots\ldots\ldots.1$$

Where :

LDR	=	Loan to deposit ratio
DDR	=	Demand Deposit Rate
TDR	=	Time Deposit Rate
FDR	=	Foreign Currency Deposit Rate
VDR	=	Volume of deposit to rural branches
IFR	=	Inflation Rate
IRS	=	Interest Rate Spread
M	=	Stochastic error term
t	=	Time-series dimension and ranges from 1 to T

α_1, α_2, α_3, α_4, α_5, and α_6 are the parameters estimated. Logically, it is expected that a positive relationship between the bank deposit mix and financial sustainability. Hence, the apriori expectations are α_1, α_2, α_3, α_4, α_5, and $\alpha_6 > 0$. Analysis was performed using econometrics tools and VAR estimation procedure was used to evaluate bank deposit variables on the dependent and control variables. The procedure employed E-view version 9.0.

4. RESULTS AND DISCUSSION

Data Presentation

YEAR	Independent Variables						Dependent Variable	Control Variables	
	DDR	TDR	SDR	TDR	FDR	VDRB	LDR	INF	IRS
2001	0.0868632	0.4741716	0.4286615	0.0102447	0.7586981	4.227267	65.6	18.873	8.2

2002	0.1258787	0.4796985	0.3773893	0.0169565	0.7072389	4.172066	62.8	12.876	8.1
2003	0.1534923	0.4304672	0.3935959	0.0224948	0.7344107	4.31285	61.9	14.031	6.5
2004	0.1610653	0.4403885	0.361389	0.0371975	0.698308	4.809492	68.6	14.998	5.5
2005	0.166813	0.459122	0.3529939	0.0210711	0.9394205	4.266276	70.8	17.863	7.4
2006	0.1284811	0.5111723	0.3472286	0.0131473	0.9166871	3.49396	63.6	8.239	7.2
2007	0.1540487	0.5527216	0.278553	0.0146877	0.8250837	3.488875	70.8	5.382	6.7
2008	0.1280905	0.5869795	0.2760603	0.0088722	0.6974036	4.127487	80.9	11.577	3.5
2009	0.3924154	0.3345907	0.122574	0.1504199	0.3174304	3.518014	85.7	11.537	5.1
2010	0.4258242	0.2815508	0.1506588	0.1419672	0.3537445	2.74935	74.2	13.72	11.1
2011	0.4507745	0.233092	0.1541175	0.162016	0.3721792	5.394968	44.8	10.84	10.3
2012	0.4228563	0.243786	0.1419756	0.1913828	0.5033992	5.575544	42.3	12.217	8.4
2013	0.3890302	0.2656463	0.1422278	0.2030957	0.6553258	4.227267	38	8.475	8.8
2014	0.3321722	0.2705757	0.1497141	0.247538	0.8832892	4.172066	64.2	8.062	7.2
2015	0.3408542	0.265618	0.1752484	0.2182795	1.0071859	4.31285	69.6	9.009	7.7
2016	0.3213483	0.2087469	0.2349552	0.2349496	0.8889974	4.809492	303.8	15.675	9.4
2017	0.2298515	0.4607907	0.1546803	0.1546775	0.6892329	4.266276	312.7	16.523	8

Source: CBN Statistical Bulletin, 2017.

Results of Data analysis

The results of Phillips-perron test of stationarity of the selected bank variables for the study are reported in the table below. In examining stationary of the chosen variables and to obtain a reliable result, the paper carried a stationary test of the variables using Phillips Perron tests at intercept with and without trend, which is presented in Table 4.1.

Table 4.1 Unit Root Test Results

Variable	Order	ADF	Critical Value at 5%	Prob.<0.05	Decision	Conclusion
LDR	I(1)	-3.6262	-3.0810	0.0182	No unit root	Stationary
DDR	I(1)	-3.2278	-3.0810	0.0384	No unit root	Stationary
TDR	I(1)	-3.9143	-3.0641	0.0194	No unit root	Stationary
FDR	I(2)	-4.6741	-3.0989	0.0031	No unit root	Stationary
VDR	I(1)	-6.7916	-3.0810	0.0001	No unit root	Stationary
INF	I(1)	-5.0723	-3.0810	0.0013	No unit root	Stationary
IRS	I(1)	-5.4891	-3.0810	0.0006	No unit root	Stationary

Source: E-views 9.0 Extracts

Based on the Phiilips-perron test results, Loan to Deposit Rate (LDR), Demand Deposit Rate (DDR), Time Deposit Rate (TDR), Foreign Currency Deposit Rate (FDR), Volume of Deposit to total rural branches (VDR), Inflation Rate (INF) and the Interest Rate Spread (IRS) variables were stationary at level, I(1) as the PP-values are greater than critical value at 5%. In addition, the associated probability values were less than 0.05 at 5%. Variables co integrated at I(1) produces a stationary series, there is possibility of co integration

among them to determine existence of a long-run relationship. However, co integration is not established for the existence of a long-run relationship among series as a result of fewer numbers of observations (17 years). Co integration test fails.

Table 4.2 Vector Autoregression Model (VAR) Results

Vector Autoregression Estimates
Sample (adjusted): 2003 2017
Included observations: 15 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	LDR	INF	IRS
LDR(-1)	1.240240	0.058175	0.013216
	(0.50123)	(0.02333)	(0.00878)
	[2.47439]	[2.49365]	[1.50446]
LDR(-2)	3.692109	0.044206	0.020110
	(2.82801)	(0.13163)	(0.04956)
	[1.30555]	[0.33584]	[0.40576]
INF(-1)	-7.374709	-0.222153	0.000648
	(7.24632)	(0.33727)	(0.12699)
	[-1.01772]	[-0.65867]	[0.00510]
INF(-2)	-9.729611	-0.377005	0.211870
	(7.18157)	(0.33426)	(0.12586)
	[-1.35480]	[-1.12788]	[1.68338]
IRS(-1)	-3.870203	-0.426389	0.067689
	(12.3650)	(0.57552)	(0.21670)
	[-0.31300]	[-0.74088]	[0.31236]
IRS(-2)	9.435732	0.582884	-0.321255
	(13.3020)	(0.61913)	(0.23312)
	[0.70935]	[0.94145]	[-1.37805]
C	22.34647	57.04732	0.965373
	(564.672)	(26.2822)	(9.89610)
	[0.03957]	[2.17056]	[0.09755]
DDR	-35.09843	-29.20051	16.40722

	(336.147)	(15.6457)	(5.89111)
	[-0.10441]	[-1.86636]	[2.78508]
FDR	307.4838	0.810814	5.265842
	(165.738)	(7.71416)	(2.90463)
	[1.85524]	[0.10511]	[1.81292]
TDR	-1251.375	-159.4377	-19.14698
	(1181.52)	(54.9931)	(20.7067)
	[-1.05912]	[-2.89923]	[-0.92468]
R-squared	0.810400	0.759687	0.887591
Adj. R-squared	0.469119	0.327124	0.685253
Sum sq. resids	20050.32	43.43638	6.158242
S.E. equation	63.32506	2.947418	1.109797
F-statistic	2.374583	1.756246	4.386692
Log likelihood	-75.26870	-29.25843	-14.60714
Akaike AIC	11.36916	5.234457	3.280952
Schwarz SC	11.84119	5.706491	3.752985
Mean dependent	96.79333	11.87333	7.520000
S.D. dependent	86.91144	3.593142	1.978167

Determinant resid covariance (dof adj.)	37761.48
Determinant resid covariance	1398.573
Log likelihood	-118.1763
Akaike information criterion	19.75684
Schwarz criterion	21.17294

Source: E-views 9.0 Extracts

The results from the VAR equations in Table 4.3 above suggest that Time Deposit Rate (TDR) impacted negatively on Loan to Deposit Rate (LDR), Inflation Rate (INF) and Interest Rate Spread (IRS). Demand Deposit Rate (DDR) affect Loan to Deposit Rate (LDR) and Inflation Rate (INF) negatively except Interest rate spread (IRS) is positively related. Foreign Currency Deposit Rate (FDR) impacted on the dependent variable (LDR) and the control variables (INF and IRS) positively. Demand Deposit Rate (DDR) is significant to Inflation Rate (INF) and Interest Rate Spread (IRS). Foreign Currency Deposit Rate (FDR) is significant to Loan to Deposit Rate (LDR) and Interest Rate Spread (IRS). Time Deposit Rate (TDR) has significant relationship with the inflation rate (INF). In the currency year (-1), Loan to Deposit Rate (LDR) is significant with the control variables (INF and IRS). This implies short run effect of banks deposit measures on Demand Deposit Rate (DDR), Time Deposit Rate (TDR), Foreign Currency Deposit Rate (FDR) on Loan to Deposit Rate (LDR), Inflation Rate (INF) and the Interest Rate Spread (IRS).

Magnitude effect of Demand Deposit Rate (DDR) decrease Loan to Deposit Rate (LDR) and Inflation Rate (INF) by 35% and 29.2% but increases the Interest Rate Spread (IRS) by 16.4%. Foreign Currency Deposit Rate (FDR) influenced Loan to Deposit Rate (LDR), Inflation Rate (INF) and Interest rate spread (IRS) positively by 307%, 0.81% and 5.27% respectively. Time Deposit Rate (TDR) makes 12.51% and 15.9% decrease on Loan to Deposit Rate (LDR) and Inflation Rate (INF) but positively affect the Interest Rate Spread (IRS) by 19.1%. Volume of Deposit to total rural branches (VDR) suggests symmetric impact on dependent and control variables.

The correlations of bank deposit variable of Demand Deposit Rate (DDR), Time Deposit Rate (TDR) and Foreign Currency Deposit Rate (FDR) on dependent variable (Loan to Deposit Rate (LDR)) is 0.810 (81%). The correlation of bank deposit variables with Inflation Rate (INF) is 0.759(75.9%) and the Interest Rate Spread (IRS) is 0.887(88.7%).

In addition, bank deposit explained total variation in explained by Loan to Deposit Rate (LDR), Inflation Rate (INF) and the Interest Rate Spread (IRS) by 46%, 32% and 68.5%. Among the dependent and control variables, Interest Rate Spread (IRS) has highest correlation with bank deposit variables and is explained by 68.5%.

5. CONCLUSIONS AND RECOMMENDATIONS

Conclusion

Empirical result confirms that Demand Deposit Rate (DDR) is significant to Inflation Rate (INF) and Interest Rate Spread (IRS). Foreign Currency Deposit Rate (FDR) is significant to Loan to Deposit Rate (LDR) and Interest Rate Spread (IRS). Time Deposit Rate (TDR) has significant relationship with the inflation rate (INF). In the currency year (-1), Loan to Deposit Rate (LDR) is significant with the control variables (INF and IRS). This implies short run effect of banks deposit mix measures on Demand Deposit Rate (DDR), Time Deposit Rate (TDR), and Foreign Currency Deposit Rate (FDR) on Loan to Deposit Rate (LDR), Inflation Rate (INF) and the Interest Rate Spread (IRS). Control variable of Interest Rate Spread (IRS) has highest correlation with banks deposit mix variables and is explained by 68.5% bank financial sustainability in Nigeria.

Recommendations

Based on the findings and conclusion, the paper recommends that:

1. Nigeria Monetary policy committee (MPC) should device a suitable control variables (inflation and interest rates) impacting on the rates of bank deposit in Nigeria.

2. Current international image of Nigeria should be maintained and sustained to further enhance foreign currency deposit rate to enable stable exchange and inflation rates.

3. Volume of deposit to total rural branches (VDR) should be improved to create effective Loan to Deposit Rate (LDR).

References

1. Bogan, V.L. (2012). Capital structure and sustainability: An empirical study of microfinance institutions. *Rev. Econ. Stat.*, 94, 1045–1058

2. Bouwman, C. H. S. (2013). *Liquidity: How banks create it and how it should be regulated.* Forthcoming in The Oxford Handbook of Banking (2nd edition; A. N. Berger, P. Molyneux, and J.O.S. Wilson (Eds.))

3. Chikwem, O. S. (2018). Effects of deposits mobilization on the financial performance of microfinance banks in Nigeria -A study of Umuchinemere pro-credit microfinance bank limited (2005-2014). Unpublished Master's Thesis submitted to Godfery Okoye University, Ugwuomu-Nike, Enugu State, Nigeria.

4. Dancan, M. O. (2012). Effect of level of deposits on the financial performance of commercial banks in Kenya. Unpublished Master's Thesis submitted to the Business Administration University of Nairobi.

5. ECB (2009). EU banks' funding structures and policies.*European Central Bank*, http://www.ecb.europa.eu

6. Girma, J. D., & Jiqin, H. (2018). Effect of deposit mobilization on the financial sustainability of rural saving and credit cooperatives: Evidence from Ethiopia. Sustainability, 10, 3387.

7. Gul, S. Irshad, F., & Zaman, K. (2011). Factors affecting bank profitability in Pakistan the Romanian.*Economic Journal*, 39(1), 65-87.

8. Mahinda, W., Jacob, Y., Michele, M. (2017). Assessing the financial and outreach efficiency of microfinance institutions: Do age and size matter? *J. Multinational Financial Management*. 40, 63–76.

9. Mahshid, S. (2016).Deposit funding and loan volatility in the Iranian banking system. *Iranian Journal of Economic Studies, 5(2), 223-234.*

10. Menicucci, E. &Paolucci, G.(2016). The Determinants of bank profitability: empirical evidence from the European banking sector. Journal of Financial Reporting and Accounting, vol. 14(1),86-115

11. Meyer, R.L. (2002). Track Record of Financial Institutions in Assisting the Poor in Asia; Asian Development Bank Institute: Tokyo, Japan.

12. Morduch, J. (2000).The microfinance schism. World Dev, 28, 617–629.

13. Muriu P (2011). *Microfinance Profitability: Does financing choice matter?* Birmingham Business School University of Birmingham.

14. Mwangi, M., Muturi, W., & Ombuki, C. (2015). The effects of deposit to asset ratio on the financial sustainability of deposit-taking microfinance institutions in Kenya *International Journal of Economics, Commerce and Management, United Kingdom*, 504-511.

15. Narayana, M, Suman, K. C., & Ashok, K. P. (2015). Deposit Mobilization of Commercial Banks: A Comparative Study of BOB and Axis Bank in Bhubaneswar City. *Journal of Management Research and Analysis,* 2(3), 195-203.

16. Ogbulu, O. M., Uruakpa, P. C., & Umezinwa, C. L. (2015). An empirical investigation of the impact of deposit rates on fund mobilization by deposit money banks in Nigeria. *Journal of Finance and Bank Management*, 3(1), 77-89.

17. Ruochen, W., & Xuan, W. (2015). What determines the profitability of banks? Evidence from the US. Unpublished Master's Thesis submitted to Simon Fraser University.

18. Torbira, L. L., & Ogbulu, O. M. (2014). Bank Deposit and Performance. *International Journal of Financial Research*, 5(2), 19-23

19. Vink, H. G. H. (2010). Determinants of deposit rates: Which factors influence the deposit rates in the Dutch retail deposit market? *Master thesis in Financial Management*. Tilburg University, Faculty of Economics and Business Administration.

20. Woller, G. M., Dunford, C., & Woodworth, W. (1999). Where to microfinance. *Int. J. Econ. Dev.*, 1, 29–64.