

Portfolio Diversification and Return on Equity of Deposit Money Banks in Nigeria

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ABSTRACT

Portfolio Diversification and return on equity of deposit money banks in Nigeria for the period 1990-2020 is the focus of this paper. Treasury bills, acquisition of ordinary shares capital, investments in subsidiaries, and foreign investments outside Nigeria were the explanatory variables and proxies for Portfolio Diversification while return on equity is the dependent variable for all deposit money banks in Nigeria, for the periods under review. In the course of the study, data were obtained from the website of Central Bank of Nigeria statistical bulletin and annual report of Nigerian Deposit Insurance Corporation (NDIC). The Augmented Dickey Fuller (ADF) test option was used to test for unit roots. The autoregressive distributed lag (ARDL) and bounds test tools were used to estimate the short and long run relationships respectively. The study discovered that at short run, treasury bills, and ordinary share capital are negatively related and not significantly related to return on equity, while investments in subsidiaries and foreign balances outside Nigeria are positively related to return on equity of DMBs at most lag periods. It was further observed that at different lag periods, the variables do not significantly predict the direction of return on equity of DMBs. Long run relationship was also observed to exist amid treasury bills, acquisition of ordinary shares capital, investment in subsidiaries, foreign investments outside Nigeria and return on equity of all deposit money banks in Nigeria for the period 1990- 2020. At short run period, DMBs should diversify into investments in subsidiaries, as this would improve return on equity. Deposit Money Banks should also diversify into foreign holdings that would yield positive net present values. Deposit money banks in Nigeria should diversify into foreign investments with the right mix that would improve return on equity. Those

were some of the recommendations given, to the government, monetary authorities, Central Bank of Nigeria, researchers, deposit money banks and other interested stakeholders in Nigeria.

Keywords: *Return on equity, portfolio, diversification, bounds test, treasure bills, investments in subsidiaries.*

1. INTRODUCTION

The study of portfolio diversification and return on equity is not a strange area of study in the pool of studies in finance and banking. Enrico and Hien (2016) asserted that, business entities diversify as long as they see the opportunity to consolidate their market power, which predicts a linear positive relationship between diversification and return on equity. Diversification strategies undertaken by growth-oriented managers, may lead to economies of scale and at the same time increase firms' market power, De-Young and Rice (2004) further submitted that, banks are increasingly exploiting nontraditional avenues of generating income, to the extent that in recent times, almost half of banks' incomes are obtained from non-traditional activities and this reflects not only diversification by banks into nontraditional activities, but also a shift in the way deposit money banks earn income.

The conventional practice in the banking industry is that earnings from noninterest products are more stable than loan-based earnings, and that noninterest activities reduce bank risk via diversification (Nisar, Peng, Wang, & Ashraf, 2018). This is based on the fact that different portfolios achieve different returns on investments when subjected to different economic conditions.

With the banking industry in Nigeria evolving over time, the use of technology such as, Automated Teller Machines (ATM), Point of Sale (POS), internet banking, mobile banking, emails, remita payment system, has become imperative for deposit money banks. The banks are faced with no option than to diversify, in line with innovations and geographical spread. Olarewaju, Stephen and Mabutho (2017) in their submission attested that, banks diversification as a strategy, does not predict negative returns, however, the idea of diversification could increase the exposure to operational diversification risk. This can however be mitigated by strong management expertise to ensure success and possibility of a stable financial position and overall survival. They maintained that for diversification to attain its desired goals, there should be frequent checks and monitoring of the market portfolios, so as to reduce risk and maximize returns.

Overtime, banking activities in Nigeria has evolved from mere traditional banking practice of granting of commercial loan to earn interest and intermediation role of bridging the gap between surplus and deficit units of the economy, to high level of portfolio diversification, as observed in the statements of financial positions of deposit money banks. The statements of financial positions of the banks in Nigeria reports high level of investments in subsidiaries, claims with CBN, foreign currency holdings, quoted investments with the private sector financial derivatives, asset size etc.

All these are aimed at ensuring, that deposit money banks (DMB) in Nigeria diversify its products and services with the view of making returns (Abel, 2015 & Amety, Gregory, Maurice, 2016).

1.2 Statement of the Problem

There are paltry studies on Portfolio diversification as it affects return on equity in the banking and finance journals available. The study by Uniamikogbo, Okoye and Arowoshegbe (2020) dwelt on income diversification and performance, the outcome shows that, income diversification has a positive influence on financial performance. The study used only 8 banks for a period of 10 years (2008-2018).

Due to inconsistent results, small sample size and length of time used by previous studies, which creates a gap in literature, this current study, on portfolio diversification and return on equity of all deposit money banks for a period of thirty one years (1990-2020) became imperative to ascertain the claims of earlier studies across the world and Nigeria in particular, aimed at filling the identified research gap.

1.3 Objectives of the Study

The main objective of the study is to determine the relationship amid bank diversification and return on assets of deposit money banks in Nigeria. Specifically, the study is to:

- I. determine the degree of relationship between treasury bills and return on equity,
- II. ascertain the extent of relationship amongst ordinary share capital and return on equity
- III. determine the extent of relationship between investments in subsidiaries and return on equity; and
- IV. establish the relationship between foreign investments outside Nigeria and return on equity of deposit money banks in Nigeria.

1.4 Research Questions

The following research questions are hereafter formulated;

- I. What relationship exists between treasury bills and return on equity?
- II. What pattern of relationship exists between ordinary shares capital and return on equity?
- III. To what extent is the relationship between investments in subsidiaries and return on equity of DMB in Nigerian?
- IV. What extent does foreign investments outside Nigeria influence return on equity of deposit money banks in Nigeria?

1.5 Research Hypotheses

Based on the study questions, the following hypotheses are hereafter formulated in their null forms;

- I. there is no significant relationship between treasury bills and return on equity,
- II. significant relationship does not exist between ordinary shares capital and return on equity,
- III. investments in subsidiaries does not significantly influence return on equity,
- IV. there is no significant relationship between foreign investments outside Nigeria and return on equity of deposit money banks.

2. REVIEW OF RELATED LITERATURE

We shall critically look at conceptual review, theoretical review and empirical review as they relate to the study.

2.1 Conceptual Review

2.1.1 Portfolio Diversification:

The definition of Portfolio diversification by Neelam (2014) asserts that portfolio is a combination of broad asset class carefully selected to obtain optimum returns. Contractor, Sumit and Chin (2003), explained that firms derive benefits from sharing tangible resources, technological know-how, vertical integration, coordinated strategies and pooling together their negotiating power through portfolio diversification. Conclusively, firms through diversification across many activities maximize the exploitation of their valuable resources and hence increase their financial performance. Foss and Christensen (2001) agreed that diversified firms can create positive spillovers since the value of resources in one industry increases due to investment in another industry. This aligns with resources –based theory which explains the resource-benefit a firm enjoys, such that the firm’s resources can build barriers to ensure that resource holders are able to enjoy the competitive advantage in relation to other parties. The main postulation of this theory is that firms usually have productive resources that can be used to exploit productive opportunities that give room for growth.

Portfolio theory provides a normative approach to investors on how to take decisions, to invest their wealth on assets or securities under risk, where the words of Berger, Hasan and Zhou (2003). In their study of commercial banks in China, they considered four aspects of diversification which includes loans, deposits, assets, and geographical diversification. In their findings, they established that those facets of diversity are associated to high operational cost and reduced profits.

Diversification ensures that an investor’s portfolio doesn’t lean too heavily on one type of investment. Portfolio Diversification occurs when an investor manages risk by spreading out investments across different asset classes. This means investing in a variety of asset classes, such as stock in addition to material assets like real estate, or government bonds. Diversification aims to reduce the variability of bank operations by decreasing the concentration of the sources (deposits) and uses (credit) of funds and also the income that generated by these funds (Berger, Hasan and Zhou, 2010).

Portfolio Diversification includes non-interest yielding activities which influence either positively or negatively on performance. Examples of non interest income includes, issuing bank guarantees, letters of credit, import payments, shipping guarantees, advancing letters of credit and so on by deposit money banks. The effective management of these non-interest incomes could decrease risk associated with undiversified portfolio (Hosna & Manzura, 2009).

Portfolio diversification takes place the moment fund managers or investors spread available funds to different categories of investment opportunities. Diversification entails that investor’s portfolio doesn’t lean too heavily on any single investment option. Implying therefore, that investing in

other categories of investment opportunities, such as shares, real estate, government bonds, private bonds, would increase returns.

2.2 Types of Portfolio Diversification by Deposit Money Banks

Diversification of deposits: Another type of diversification is deposit diversification, according to Rose and Hudgins (2010); deposit diversification encompasses investing bank's funds to diversify categories of securities at different maturity periods. The use of deposits for investment purposes must match with the maturity period of the class of security. Short term deposits for short term money market securities, while long term deposits for long term capital market securities. The authors believe that, the risk of meeting customers withdrawal needs and loan requests can be mitigated by matching deposits against each maturity term of the securities. Another strategy of deposit diversification as explained by Rose and Hudgins (2010) can be achieved by acquiring deposits at a minimal rate from individuals, businesses, public sector or it can be obtained by classifying depositor's funds into demand, savings or time deposits, so as to match with the type of security to be invested.

Geographical diversification: this type of diversification occurs when deposit money banks spread their assets outside their territorial base or different geographical areas. The tactics of diversification can be adopted by large banks alongside its core operations. Smaller banks on the other hand, tend to be more concentrated in a particular geographical area, instead of spreading to other locations.

Revenue diversification: Revenue diversification, in the perspective of De -Young and Rice(2004), can be attained by variegating the sources of both interest and non-interest income on the bank's portfolio, as stated by De-Young and Rice (2004) includes commissions, fees, investing on money market instruments and other revenues that are related alongside specialized essence of banks activities. Improving revenue generating points can be achieved via revenue accumulation, (Mercieca & Wolfe 2007).

Credit diversification: Diversification through credit administration enables banks to lessen the risk of customers or borrowers defaulting in repaying loans by allocating credits into different groups or class of credit facilities (Jahn, Memmel & Pflingsten, 2013). Other strategies according to the researchers could be through specialized lending, screening of customers, qualify customers according to their loan request and ensuring that adequate credit risk administration is carried out, with a view of ensuring stable liquidity for the bank.

Portfolio diversification to asset categories: Portfolio divestment to different asset categories, requires fund managers or investors to allocate available funds beyond a specific type of security or investment opportunity. Also they are required to determine the percentage of fund to distribute to each category of investment option. Below are some examples of securities which investors can diversify into:

I. Real estate, land and buildings, natural resources, buildings, agriculture, livestock, solid minerals and water e.t.c.

- II. Debt Instruments such as government or corporate fixed income;
- III. Exchange traded funds- this is a marketable basket of securities that follows an index commodity.
- IV. Shares or equity in a publicly or privately traded company,
- V. Commodities, basic goods necessary for the production of goods and services
- VI. Cash and short-term cash equivalents such as treasury bills, certificates of deposits, money market vehicles e.t.c (Wikipedia.com)

Diversification on foreign entities: Portfolio diversification across territorial boundaries takes place when deposit money banks or investors, invests outside the domestic country of the investor or bank. In most instances, the investments might be unrelated with the business in the domestic country. The significance of diversification across international boundaries is to ensure that the risk in the home country may not be the same risk in the foreign country. Thus, a bank can still survive as a going concern in spite of any risk, encountered in the domestic country. A deposit money bank for instance can invest in shares in the British stock exchange and earn returns from the investment, during economic meltdown in the Nigerian economy (www.investopedia.com).

Importance of Portfolio Diversification

Banks with diversified portfolios reduces excessive risk concentration

The risk of lending should be managed at all stages of credit administration. This is necessary because some loans react at different market conditions. The performance of some loans balance off by other loans that perform better within same period of time. Thus, the meaning of this is that when portfolios are diversified, they can be very strong even if some loans perform badly.

Respond better to changing market conditions

Diversified deposit money banks respond and survive in unstable market conditions. With uncertainty in the business environment, banks should opt for loans, real estate investments, government bonds, public or private equities and so on that respond positively to various uncertain business environments.

For instance, bank's list of financial assets with different mix, are indifferent to market irregularity and is implausible to experience much loss in the event of unfavorable market condition.

Possibility of positive alliance

With portfolio diversification, some banks or firms may not be investing in a newly discovered asset class as they might lack expertise in that particular area. They might therefore, carry on with loan products which they are used to, thus maintain concentrated loan portfolios. A bank or any other financial institution for instance, which intends to expand into the manufacturing sector, or lending market, may consider the risks in that venture, which could lead to lower profitability. Therefore, going for loan programs, provided by a reputable and reliable indirect lender with plenty

of expertise in the sector, would allow a bank or credit firm to indirectly benefit from extensive expertise in applicant screening, loan underwriting, customer communication, payment collection, portfolio performance and compliance monitoring.

Deposit money banks with diversified portfolios can produce substantial returns:

The essence of portfolio diverseness is to amid other things; maximize shareholders wealth by ensuring increase in returns on investments. Ordinarily, investors expects high rate in returns which is the prospect from portfolio diversification. Strategically, allocating funds across broad range of asset class including less traditional loan products such as manufactured home loans is expected to create long term wealth for banks.

It enables banks to meet their financial/ non financial goals:

Portfolio diversification enables deposit money banks to strategically meet their portfolios to particular risk tolerance level. This could minimize exposure to market uncertainties. For example, a bank with a low risk tolerance can opt for low-risk, high-yield and high-performing loan products provided by an experienced and reputable loan organization (Triad financial services, 2017).

2.4 Demerits of Diversification:

In spite of the importance of diversification considered earlier, some disadvantages of diversification are outlined below:

- I. It is time consuming to manage a wide class of portfolios in different industries.
- II. Any bank with incomplete information and invests in an unrelated class of investment could result to poor returns on investments.
- III. Managing a pool of portfolios of investments of varying categories is also very expensive, and goes with more transaction fees and commissions.

2.5 Return on Equity: Return on equity (ROE) means profitability of shareholders of a given firm after meeting all expenses and taxes (Horne, James & Wachowicz 2005). Higher Return on equity means better managerial returns. Higher return on equity can be due to financial leverage. A highly leveraged firm would have higher return on equity which increases risk too (Horne, James & Wachowicz, 2005). Usually ROE is higher for high growth companies. $ROE = \text{Net Profit} / \text{Shareholders' Equity}$. This study used return on equity because of its wide acceptability. Return on equity is widely used as a benchmark to ascertain the healthiness of a bank or any going concern.

Relationship between investments in ordinary shares capital and returns on equity

Some scholars have observed the relationship amid investments in ordinary shares capital and returns on equity of DMB. Umar and Musa (2013) in their study measured the relationship between firm's stock prices and earnings per share. The study analyzed the impact of firm's stock prices and earnings per share between 2001 to 2009. The results show that firm's EPS has no relationship or significant impact on stock prices and should not be used to predict the behaviour of stock prices in Nigeria.

The result above by Umar and Musa (2013) on investments in ordinary shares does not have significant impact on earnings per share which was the indicator for shareholders.

Kiyamaza and Berument (2003) also looked at the relationship between acquisition of ordinary shares capital and returns on equity; they submitted that high levels of uncertainty at securities market are likely to result into low trading, grossly explained by unwillingness of firms to commit their funds into investments. This is likely to have a ripple effect on the indicators of firm performance such as profits, ROE and ROI.

Investments in subsidiaries and returns on equity by Deposit Money Banks

Investments in subsidiaries are financial resources invested externally by a business organization, such type of investment can be referred to as the expansion of the firm into related or unrelated line of business to pursue growth and profit opportunities; which the firm's financial, physical and intangible resources are leveraged (Kiyamaza & Berument 2014).

Investments in Subsidiaries, in the words of Anderson and Anders (2002) plays a strategic role by influencing returns on equity. The more the strategic relationship amid subsidiary and parent, the more likely the subsidiary will receive support and resources from the parent company to attain high performance. The parent company's strategy might be to access local markets, while others may have as their strategy, to supply and export products, to other subsidiaries (Dunning & Sarianna, 2008). The latter type of investment, have an effect on global operation of the multinational company directly, it can be expected to lead to performance.

Foreign investments and return on equity

Domestic Investors can derive the gains of diversification by investing in foreign securities in view of the fact that, they tend to be less closely correlated with domestic securities. For instance, economic environmental threats distressing the Nigerian economy may not affect Britain's economy in the same way. Hence, possessing Britain's stocks gives an investor little cushion of defense against losses in periods of economic downturn in Nigeria (www.investopedia.com).

Foreign diversification takes place when a firm invests in a market outside its national boundaries. The foreign investments and balances held by deposit money banks make up foreign diversification outside national boundaries. Capar and Kotabe (2013) submitted that foreign diversification is a growth strategy that has considerable influence on the firm's performance. Thus it is expected that an increase in foreign investments outside Nigeria would result to a corresponding increase in performance, especially when the risk is not similar with the home country.

2.6 Theoretical Review

Modern Portfolio Theory

The idea of Modern Portfolio Theory as propounded by Harry Markowitz (2002) suggested that institutions can construct portfolios that would give the highest expected returns. The theory, tries to maximize profits in a given portfolio risk or equally reduce the risk in an expected returns; it could be attained by critically selecting various investment options available in the market (Fabozzi & Gupta, 2002).

Resource Based View (RBV) Theory

The theory on resource based view could be traced to the work of Penrose (1959). Thus, the main aim of the theory lies on the fact that organizations use productive resources to exploit productive opportunities, to attain growth in the organization. The theory is based on the assumption that with deliberate managerial efforts, organizations can achieve sustainable competitive edge over its competitors thereby maximizing returns. The theory buttress further that most firms use this strategy to build barriers, so that resource holders are able to benefit from the competitive advantage against other firms in the same industry.

In the words of Contractor, Sumit and Chin (1952), firms enjoy benefits by sharing resources such as vertical integration, technological know-how, pooling together negotiating powers and so on. The theory concluded that organizations diversification strategy across business activities maximize financial performance by exploiting valuable resources at their disposal.

Agency Cost Theory

Agency Cost theory attempts to explain the relationship between two parties; the principal and the agent in a given business transaction, it is often referred to as agency dilemma. The dilemma occurs where the agent makes decision or acts on behalf of the principal in a way and manner that contradicts the interest of the principal. The dilemma arises when the agent acts in his or her best interest which does not align with the interest of the principal, thus creating a gap between goals and desires between agent and principal in an organization.

Owies (2012) submitted that managers (agents) diversify the resources of an organization for their own interest. He further asserted that managers diversify organizations resources to increase their power and prestige, boost their own compensation package, make themselves more secure, by investing in businesses which would require their skills with the view of reducing their own employment risk. Another author, Lindgren (2005) strengthened the position of Owies (2012), by stating that diversification has no intension for maximization of value and increasing performance. The theory concluded that it reduces the value of the organization instead of increasing it due to the agency interest and its associated cost.

Capital Market Theory:

The capital market theory as postulated by Markowitz explains how rational investors should build efficient portfolios. The capital market theory shows the relationship between rate of returns which investors seek and likewise the inherent risk associated with it. The investors who are rational would seek to invest in financial assets with high returns. The capital market theory agrees as a proposition, when valuing financial assets describing, how different assets need to be priced in the capital market. It also describes and evaluates the advancement of capital and financial market over a certain period of time.

2.7 Empirical Review

The study by Ammar and Boughrara (2019), critically considered the effect of revenue diversification on bank performance from 1990 - 2011 in Middle East and North African countries. A sample size of 275 banks were used. The researchers used Generalized Method of Moments

(GMM) technique to estimate the equation. The outcome of the study showed that diversification improves bank returns. They also asserted that trading-generating business lines contribute to profitability and stability.

Gerald (2018) discovered in his study on Effects of Portfolio Diversification on Financial Performance of commercial Banks in Kenya. Forty (40) Commercial Banks in Nairobi, Kenya, were analyzed for the period 2013-2017. Descriptive and regression analysis were adopted as the tool of analysis. The result shows a strong positive relationship amid portfolio diversification and Performance of commercial banks in Nairobi Kenya for the period reviewed. A weak positive correlation was also found between bank size and commercial banks performance in Nairobi, Kenya.

Non-interest income and profitability of Indian banks was studied by Ahamed (2017) for the period 2006-2015. A total of 16 banks were studied using multiple regression analysis to estimate the equation. The Findings of the study showed that higher share of non-interest income yields higher profits when banks are involved in more trading activities. The results indicate that private foreign banks perform better, compared to public sector and private domestic banks. It was also found that income diversification benefits more to the banks that have lower asset quality, compared to the banks that have higher asset quality.

Studies by Saunders, Schmid, and Walter (2016) on diversification of banks across non-traditional interest generating businesses and bank profitability for the period 2002-2013. A sample of 10,341 US banks was examined, using multiple regression technique to estimate the equation. The researchers discovered that a higher ratio of non-interest income (derived from fees and non-core activities such as investment banking, venture capital and trading) to interest income (associated with deposit-taking and lending to retail and commercial clients) was related to greater returns on equity and overall performance.

From the work of Yan, Talavera and Fahretdinova (2016), they examined the effect of product diversification on profitability of banks in Azerbaijan. The study used data for six different types of loans and four types of deposits. The result of the study showed a negative relationship amid loan-based portfolio diversification and bank return on equity. It was also revealed that deposit-based diversification had a positive correlation with return on equity of the banks in Azerbaijan.

In the work of Makhoha, Namusonge and Sakwa (2016) the researchers conducted a study on portfolio diversification and financial performance of commercial banks in Kenya. The researchers used primary data and administered questionnaires and interviewed 133 bank managers randomly and 43 commercial banks. The study concluded that portfolio diversification positively relates with financial performance and is a significant predictor of the movement of financial performance of commercial banks in Kenya.

The impact of bank size and funding risk on bank stability was examined by Michael (2015) in Ghana. The researcher obtained data from the rural banking industry in Ghana. Ratio analysis and z-score was used as method of analysis. The findings of the study suggest a linear relationship amid size of rural banks and stability of the banks in Ghana. Implying however that, an increase in the size of a rural bank will cause a corresponding increase in bank stability, it also revealed that the risk of funding, impacts positively on bank stability in Ghana.

Sibel and Ihsan (2012) conducted a study on Banks Diversification and its effect on financial performance in Turkey. Regression analysis was used to estimate the equation; the result indicates that geographical diversification increases banks performance.

In their investigation Turkmen and Yigit (2012) looked at sectoral and geographical credit diversification on the performance of Turkish Banks, for the period 2007-2011. Forty (40) Turkish banks were used as the sample size. The study adopted Herfindahl=Hirschman Index as tool of analysis. The outcome of the study showed negative relationship amid sectoral and geographical diversification and return on equity. The researchers argued that the negative correlation is related to increase in cost of diversification, which offsets the benefits of thereof.

Iqbal, Hameed and Qadeer (2012) researched on the impact of diversification on firms' performance in Pakistan for the period 2005-2009. The study used a sample of forty (40) companies in Pakistan and relied on secondary data for the study. The result showed that positive relationship was not found amid diversification and firms' performance.

The study by Saoussen and Dominique (2011) also shows empirical review on diversification. The study examined 'shift into non-interest based activities of banks and financial performance of banks in East Asia', for the period 1997-2007. A total of 714 banks were sampled. The study used the basic Herfindhal-type approach for the analysis. The result of the study showed that diversification gains are more than offset the cost of increased exposure to the non-interest income, specifically by the trading income volatility.

Olu (2009) in his study on impact of diversification and returns on equity of firms, the researcher used regression analysis to estimate the equation. The study indicated a correlation coefficient of $r = 0.851$ (r-squared) and $r = 0.823$ (adjusted r-squared) representing a strong positive relationship between geographical diversification and firms returns.

The empirical study of Acharya and Saunders (2006) also comes to focus. The researchers studied on the impact of loan portfolio diversification on returns on equity of Italian banks. The study made use of Herfindahl-Hirschman Index (HHI) as a measure of loan portfolio diversification across different industries and sectors. The result indicates that diversification does not lead to increased returns; neither does it lead to the safety and sound health of the bank. It was also noted that banks with high credit risk in their loan portfolio experienced poor bank returns via portfolio diversification.

Stiroh (2004) assessed the ‘potential benefit of diversification for US banks engaged in non-interest activities, for the period 1984-2001, the results shows that net interest income and noninterest income (which is relatively more volatile) are increasingly correlated with returns.

3. METHODOLOGY

This section contains how the data was collected, designed, model specified, and preliminary tests conducted.

3.1 Research Design: The design of this study is quantitative, and the type of quantitative design is correlation design meant to determine the relationship between the variables; portfolio diversification by deposit money banks and returns on equity. The study identified four proxies for Portfolio diversification; Treasury bills, ordinary shares capital, investment in subsidiaries, foreign investments outside Nigeria and returns on equity in Nigeria as explanatory variable.

3.2 Data Collection: The data for this study were basically sourced from the website of the central bank of Nigeria (CBN) statistical bulletin and annual report of NDIC obtained from their website, from 1990 to 2020.

3.3 Model Specification

Model specification is a mathematical expression used to measure the economic relationship between variables (dependent and independent variables). In this case we specify a functional and econometric models for the dependent and independent variables of the study.

$$ROE= f(TB,OS,INVS,FION,).....(1)$$

Assuming a linear relationship amongst the variables, the econometric relationship of the functional form is written as follows:

$$\ln ROE= \beta_0 + \beta_1 \ln TB + \beta_2 \ln OS + \beta_3 \ln INVS + \beta_4 \ln FION + U.....(2)$$

Where:

ROE= Return on Equity

Ln ROE= Natural log of return on equity

TB= Treasury bills

LnTB=natural log of Treasury bills

OS= Ordinary share capital

LnOS= natural log of ordinary shares

INVS=Investments in subsidiaries

LnINVS= natural log of investments in subsidiaries

FION= Foreign Investments held outside Nigeria

LnFBON= natural log of Foreign balances held outside Nigeria

U= stochastic error term

B0, = constant

b1, b2, b3, b4, = coefficients and are the parameters to be estimated

3.4 Data Analysis Technique

The study adopted econometric technique to analyze the data. Econometrics is concerned with the empirical determination of economic laws. It is a combination of economic theory, mathematical economics and statistics but it is completely distinct from each of these three branches of science,(Frisch & Bjerkholt 1995).

In view of the above, the Autoregressive Distributed Lag (ARDL)/bound testing approach developed by Pesaran *et al* (2001) was adopted to establish a long run relationship between the variables in the model. This is due to the mixed order of integration of variables, i.e. it can be used with a mixture of variables integrated at levels 1(0), variables integrated at first difference 1(1) or variables that are fractionally integrated (see Persaran et al, 2001). But for the avoidance of having any variable integrated at order 2, we used the Augmented Dickey Fuller (ADF) test to formally explore the stochastic properties of each individual series.

4. ANALYSIS AND RESULTS

4.1 Test For Stationarity (Unit Root Test)

The Augmented Dickey-Fuller test statistic was chosen to test for stationarity of the data. The following results were obtained from e-views 10 version.

Table 1, results of the Augmented Dickey-Fuller Unit Root

VARIABLES	ADF TEST STATISTIC AT		CRITICAL VALUES	ORDEROF INTEGRATION
	LEVEL	1 ST DIFF		
			5%	I(d)
LnROE	-4.607216		-3.699871 -2.976263 -2.627420	1 (0)
LnTB	- 3.301513(pro.0.0249)		-3.699871 -2.976263 -2.627420	1 (0)
LnOS		-6.487025	-3.711457 -2.981038 -2.629906	1 (1)
LnINVS		-8.120116	-3.711457 -2.981038 -2.629906	1(1)

LnFION		-9.624682	-3.689194 -2.971853 -2.625121	1(1)
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Source: Researchers' compilation from e-views 10 output

The test result shows the order of stationarity (unit root) of the dependent and independent variables. While ROE and TB are stationary at level 1(0), OS, INVS and FION are stationary at first difference 1(1). This implies that the regression equation would be estimated using Auto Regressive Distributed Lag (ARDL), due to the mixed order of integration.

4.2 Interpretation of Result

4.2.1 Auto regressive distributed lag (ARDL) test result

The table below shows the test result obtained from the e-views 10 software indicating the short run relationship amid dependent variable and the explanatory variables.

Table 2 showing ARDL result

Dependent Variable: LNROE				
Method: ARDL				
Date: 07/25/21 Time: 07:08				
Sample (adjusted): 1995 2019				
Included observations: 21 after adjustments				
Maximum dependent lags: 3 (Automatic selection)				
Model selection method: Akaike info criterion (AIC)				
Dynamic regressors (3 lags, automatic): LNTB LNOS LNINVS LNFION				
Fixed regressors: C				
Number of models evaluated: 768				
Selected Model: ARDL(3, 3, 3, 3)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LNROE(-1)	-0.043665	0.169837	-0.257098	0.8398
LNROE(-2)	0.309119	0.099627	3.102775	0.1985
LNROE(-3)	-0.041052	0.077368	-0.530608	0.6894
LNTB	1.594128	0.407896	3.908171	0.1595
LNTB(-1)	-0.939023	0.248640	-3.776636	0.1648
LNTB(-2)	-0.391749	0.324590	-1.206903	0.4405
LNTB(-3)	-1.206200	0.242509	-4.973826	0.1263
LNOS	0.530996	0.231135	2.297338	0.2614
LNOS(-1)	-0.670321	0.231739	-2.892570	0.2119
LNOS(-2)	-0.356110	0.150272	-2.369768	0.2542
LNOS(-3)	0.382416	0.098466	3.883735	0.1604

LNINVS	0.927198	0.453031	2.046653	0.2893
LNINVS(-1)	-1.149670	0.418304	-2.748411	0.2222
LNINVS(-2)	0.026870	0.319363	0.084136	0.9466
LNINVS(-3)	0.463921	0.408663	1.135217	0.4597
LNFION	-0.411212	0.626469	-0.656397	0.6302
LNFION(-1)	0.207947	0.378245	0.549768	0.6800
LNFION(-2)	1.535950	0.496847	3.091394	0.1992
LNFION(-3)	-0.901568	0.536261	-1.681211	0.3416
C	4.163903	4.060518	1.025461	0.4920
R-squared	0.997502	Mean dependent var	3.256796	
Adjusted R-squared	0.950033	S.D. dependent var	0.986417	
S.E. of regression	0.220496	Akaike info criterion	1.325636	
Sum squared resid	0.048618	Schwarz criterion	0.330853	
Log likelihood	33.91918	Hannan-Quinn criter.	1.109743	
F-statistic	21.01409	Durbin-Watson stat	2.413152	
Prob(F-statistic)	0.170358			

(Source: e-views 10 output)

4.3 Interpretation of Results

From table two, the short run result shows R-sqaure at 0.997502 while the adjusted R-sqaured shows a percentage of 0.950033. This implies that the predictor or independent variables account for 95% changes in the return on equity of deposit money banks in Nigeria, thus are good enough to predict the movement of the dependent variable. Thus TB, OS, INVS, and FION are best fits to predict or influence the direction of return on equity of deposit money banks in Nigeria.

At lag 1, 2 and 3, the result shows that diversifying into treasury bills has a negative relationship with return on equity with -0.939023, -0.391749 and -1.206200 respectively thus a 1% increase in treasury bills will lead to -0.939023, -0.391749 and -1.206200 decrease in return on equity. At same lag periods, the probability values are all greater than the 5% critical level, an indication that diversification through treasury bills by DMBs does not significantly predict the movement of return on equity at those lags periods. Thus the null hypothesis is accepted at the short run period. At lags 1 and 2, the result shows that diversification through acquisition of ordinary shares capital has a negative relationship with return on equity with -0.670321, and -0.356110, thus a 1% increase acquisition of ordinary shares will lead to -0.670321, and -0.356110, decrease in return on equity at those lag periods. At lag 3 however, the result revealed a positive correlation with return on equity with 0.3824, thus a 1% increase in acquisition of ordinary shares leads to 0.382416 increases in return on equity. The probability values however do not indicate significant relationship as the values are all greater than the critical values. The short run period does not show significant relationship between the variables. Therefore, the null hypothesis is accepted at 5% level of significance.

At lag 1, the result shows that investments in subsidiaries by deposit money banks has a negative relationship with return on equity with -1.149670 , thus a 1% increase in investment in subsidiary will lead to -1.149670 decrease in return on equity. At lags 2 and 3, a positive relationship was observed at 0.026870 and 0.463921 respectively. Thus a 1% increase in investments in subsidiaries would lead to 0.026870 and 0.463921 increase in return on equity. No significant relationship was found as the probability values are all greater than the critical value. We conclude that the null hypothesis is accepted

At lags 1 and 2 foreign Investments outside Nigeria by DMBs are seen to be positively related to returns on equity. The results show 0.207947 and 1.535950, an implication that a 1% increase in FBON will lead to an increase in return on equity at 0.207947 and 1.535950 of deposit money banks in Nigeria. Therefore the null hypothesis is rejected at 5% level of significance. Their probability values are all greater than the critical value of 5%. Thus we conclude that FBON does not significantly predict the direction of return on equity of DMBs in Nigeria. The null hypothesis is accepted.

4.3.2 Long Run Bounds Test Result

Table 3 long run result

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Sig.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	18.97694	10%	2.2	3.09
k	4	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37
Actual Sample Size	21		Finite Sample: n=35	
		10%	2.46	3.46
		5%	2.947	4.088
		1%	4.093	5.532

(Source: e-views 10 ARDL output)

The bounds test result as shown in table 3 revealed an F –statistic value of 18.97694 which is greater than the upper bound of 3.49 at 5% level of significance. The null hypothesis is rejected at 5% level, and conclude that there is a long run relationship between return on equity and all the independent variables; Treasury bills, ordinary shares, investment in subsidiaries, and foreign balances outside Nigeria for the period studied.

4.3.3 Autocorrellation-Durbin Watson

The result of the Durbin Watson statistic shows a 2.413152 this means that there is no presence of autocorrelation in the data. Thus, the model satisfies the global criteria for the test of the presence of autocorrelation as one of the regression assumptions.

4.3.4 Granger Causality Test Result

Table 4

Pairwise Granger Causality Tests			
Date: 08/04/21 Time: 16:22			
Sample: 1990 2019			
Lags: 2			
Null Hypothesis:	Obs	F-Statistic	Prob.
LNTB does not Granger Cause LNROE	25	1.10219	0.3515
LNROE does not Granger Cause LNTB		2.83617	0.0823
LNOS does not Granger Cause LNROE	23	1.46285	0.2578
LNROE does not Granger Cause LNOS		0.54303	0.5902
LNINVS does not Granger Cause LNROE	23	3.72000	0.0444

(Source: e-views 10 output)

The granger causality results above show that bi-directionally TB does not granger cause ROE at 0.3515 and 0.0823 respectively the probability values are higher than 5% level of significance. We observe also that bi-directionally OS does not granger cause ROE at 0.2578 and 0.5902 respectively. Unidirectional causality was observed between INVS and ROE at 0.0444. Bidirectional causality was found amid INVS and FION. FION also granger causes OS and INVS as the values are all lower than the 5% critical level.

4.4. Discussion of Findings

The findings above has shown that portfolio diversification through treasury bills, acquisition of ordinary shares capital, investments in subsidiaries, and foreign balances outside Nigeria all jointly predict the movement of return on equity of deposit money banks in Nigeria. At short run period negative relationship was found between Portfolio diversification into treasury bills return on equity, at all three lag periods. The result also shows that DMBs diversification via treasury bills does not significantly predict return on equity. This suggests that divesting into Central Bank of Nigeria treasury bills, at the short run would result to drop in return on equity by DMBs. These government securities, at short run period, return on equity may not be guaranteed. This result points to the Modern portfolio theory as propounded by Harry Markowitz where he suggested that institutions should construct portfolios that would give the highest expected returns at a managerial risk level. The theory, attempts to suggest that profits can be maximized in a given portfolio by carefully selecting proportion of various investments opportunities. So DMBs should select short term securities that would yield highest level of returns on investments at short run period in other to meet liquidity needs.

The study also revealed that DMBs diversifying into acquisition of ordinary shares capital at the short run period has negative relationship with return on equity and not a significant predictor of return on equity. This aligns with the study by Jouida and Hellara (2017). Thus, buying ordinary shares of quoted companies, at the short run will not yield positive return on equity, as ordinary share capital are long term in nature and as such may not produce the needed dividend. Other capital market options such as Preference shares in unquoted companies, and debentures on corporate bonds are available. Note also, that financing decisions are managerial decisions under the control of the directors of deposit money banks in Nigeria, if there is conflict of interest, or agency problems arising between directors and shareholders of DMBs, adopting a financing option that is against the interest of shareholders would result in negative ROE at the short run period.

This result aligns with agency theory which describes the differences between goals and desires of principal and agent. According to Owies (2012) Managers diversifies to maximize their own benefits even at the expense of shareholder's interest; diversify to increase their own power and prestige, to boost their own compensation, to make themselves more secure by investing in projects that require their specific skills or to reduce their own employment risk (risk of losing their job or professional reputation). Lindgren (2005) Suggested that the agency view on diversification has no motive for value maximization and increasing in profits. This might have accounted for the negative return on equity, observed in diversification through acquisition of shares. However, at lag 3, a positive relationship was established between ordinary shares and return on equity.

Our findings also show that at two lag periods, positive relationship was observed amid investments in subsidiaries and return on equity, this result aligns with the study by Mundi (2019), however this variable is not a significant predictor of return on equity at those lag periods. We have now noticed that, DMBs diversifying into subsidiaries such as mortgages, insurance businesses, and so on, improves their return on equity hence their performance at the long run period. The Agency Cost Theory supports this outcome, the theory explains the relationship that exists between two parties, that is, the principal and agent in business, also known as agency dilemma, being a situation where one person or entity called agent is called to make decision on behalf of another party called principal. The dilemma exists in a situation where an agent who is expected to act in the best interest of his client, now acts contrary or in a manner that is unaligned to those of the principal. Hence, creating a problem due to differences between goals and desires of principal and agent. Agency theory is concerned with solving the dilemma. According to Owies (2012) Managers diversifies to maximize their own benefits even at the expense of shareholder's interest; diversify to increase their own power and prestige, to boost their own compensation, to make themselves more secure by investing in projects that require their specific skills or to reduce their own employment risk (i.e. risk of losing their job or professional reputation). So where the agents who are the directors act for the interest of the shareholders by investing in subsidiaries then there will be an overall return on equity of the deposit money banks.

Foreign Investments held outside Nigeria has a positive relationship with return on equity. This was seen in lags 1 and 2. This result agrees with Olu (2009), who discovered that the strategy of portfolio diversification impacts positively on the performance of different firms. He thereafter recommended geographical diversification in addition to other forms of diversification to ensure maximum performance. The study indicated a correlation coefficient of ($r = 0.851$) representing a

strong positive relation between Nigerian companies diversifying their companies and impact of performance as result of such diversification. The result also aligns with Yildirim, & Efthyvoulou,(2018) who revealed that the value impact of geographic diversification depends on a bank's home-country.

The bounds test result revealed long run relationship between all the explanatory variables and the dependent variables. It showed an f-statistic value which is higher than the upper bound at 5% level of significance. So we are confident that at long run, diversification through treasury bills, ordinary shares capital, investments in subsidiaries and foreign balances held outside Nigeria would increase return on equity of DMBs in Nigeria. With proper mix of corporate and tactical strategies, resources manager of DMBs are expected to deplore effectively and efficiently take decisions that would improve return on equity and ensure financial stability and survival. Also ensuring that all issues on agency conflict or dilemma are resolved, aimed at maximizing overall objectives of the Bank.

The granger causality results show uni-directionally relationship amid the variables. Treasury bills does not granger cause return on equity at 0.3515 and 0.0823 respectively the probability values are higher than 5% level of significance. We observe also that bi-directionally relationship between the variables, as ordinary shares does not granger cause return on equity at 0.2578 and 0.5902 respectively. Unidirectional causality was observed between INVS and ROE AT 0.0444. Bi-directional causality was found amid INVS and FION. FION also granger causes OS and INVS as the values are all lower than the 5% critical level.

5. CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The findings of the study on Portfolio Diversification and return on equity of deposit money banks has shown that portfolio diversification has positive and negative relationship with returns on equity at some lag period of the study especially at short run. It also revealed that long run relationship exist amid, return on equity of Deposit Money Banks in Nigeria. It reaffirms the extent to which the strategy of Portfolio diversification can mitigate against risk experienced by DMBs and ensure financial survival and stability. This serves as a wakeup call for deposit money banks in Nigeria to invest in portfolios of assets that would give positive returns on equity to meet the overall objectives of all stakeholders in the banking industry in Nigeria.

5.2 Recommendations

(1) Deposit money banks in Nigeria should diversify into investments in subsidiaries and foreign investments outside Nigeria as well as consider at the long run periods; treasury bills, acquisition of ordinary shares capital in quoted companies, investments in subsidiaries and investments in foreign assets with the view to increasing returns on equity.

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